JANUARY 1973

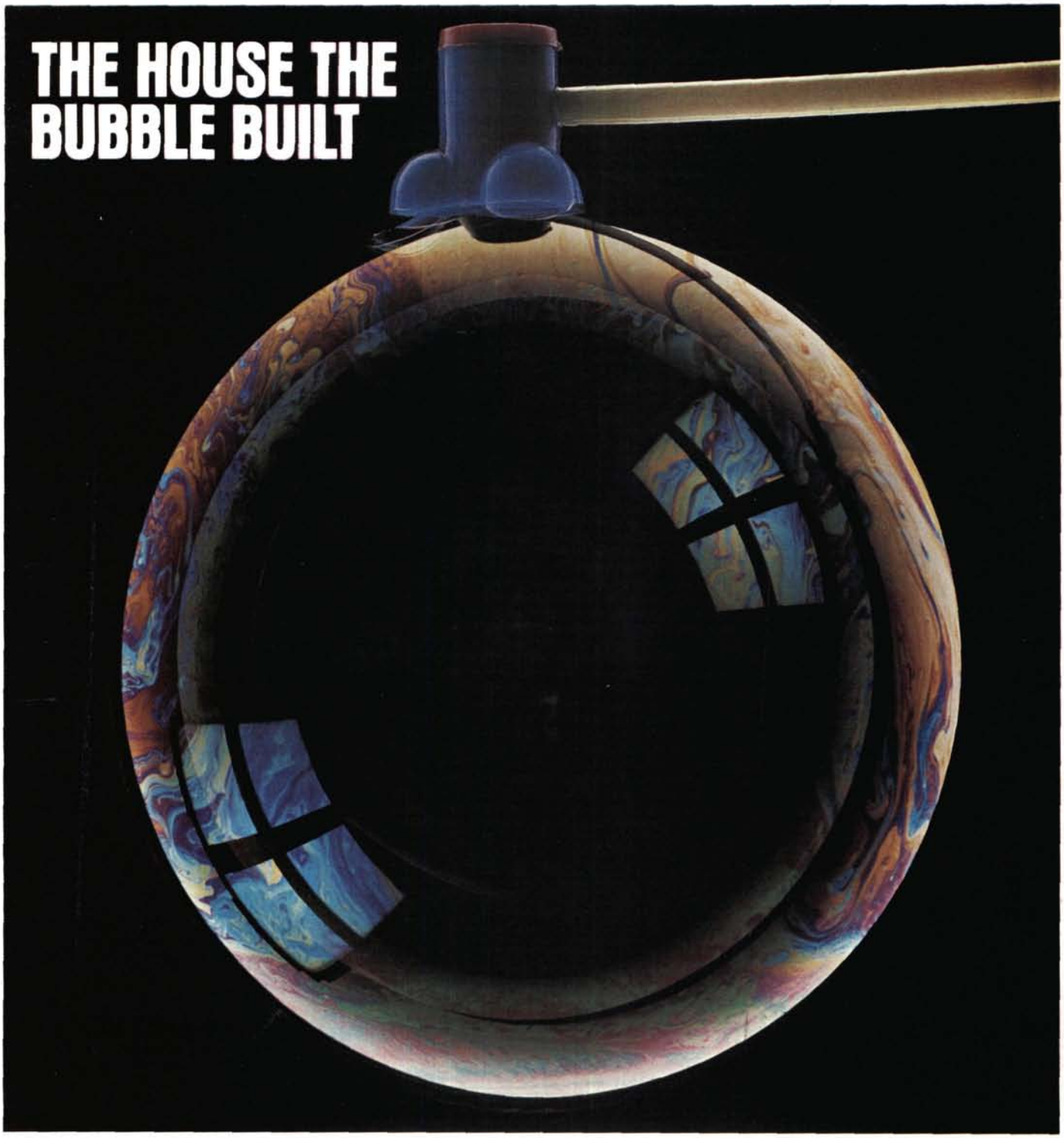
Saturday Review

ONE DOLLAR

SCIENCE

Happy Birthday, Transistor The Kingdom Where Nobody Dies Submarines Volcanic Ash Future of Medicine

THE HOUSE THE BUBBLE BUILT



ON SALE WEEK ENDING DECEMBER 23

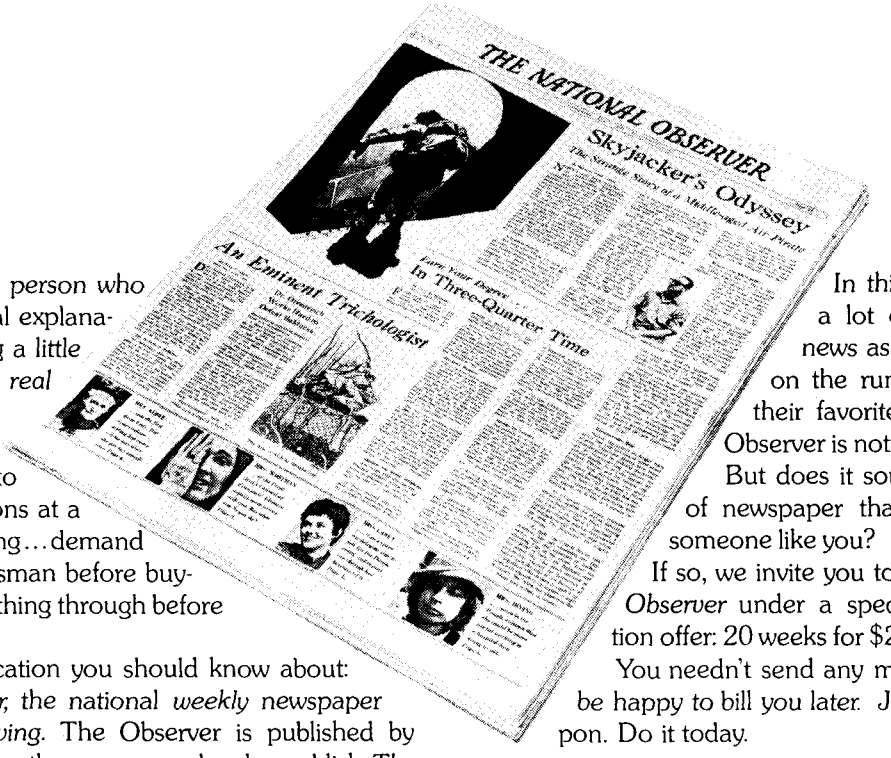
PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

ABOUT $10 A FIFTH. PRICES MAY VARY ACCORDING TO STATE AND LOCAL TAXES. 12 YEAR OLD BLENDED SCOTCH WHISKY. 86.8 PROOF. BOTTLED IN SCOTLAND. IMPORTED BY SOMERSET IMPORTERS, LTD., N.Y., N.Y.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

This newspaper isn't written for everyone

...but it might be just what you are looking for!



Are you the kind of person who rejects quick, superficial explanations...who likes to dig a little deeper and learn the *real reasons* behind important events? The kind of person who's apt to ask a few more questions at a business or PTA meeting...demand more facts from a salesman before buying...really think something through before making up your mind?

Then there's a publication you should know about: *The National Observer,* the national *weekly* newspaper for the *business of living.* The Observer is published by Dow Jones & Company, the same people who publish *The Wall Street Journal.*

When you read *The National Observer,* you not only learn *what's* happening, but also how events and issues affect the way you live. You don't just get a few quick flashes—you get all the facts. And you learn how they fit together.

Of course, this kind of intensive reporting takes more than a paragraph or two. That's why National Observer stories are sometimes longer than those in other publications. We write for readers who are willing to give the world a little more of their time.

And because these people are usually the kind who have the most interests, every issue of *The National Observer* covers a broad range of topics: government, labor, business, consumer affairs, science, the arts, books, entertainment, travel, fashions, cooking, education, and much more.

Today nearly 1,800,000 readers across the United States —thoughtful, intelligent people who want and need to make sense of what's happening—read and rely on *The National Observer.*

In fact, a national independent *TIME-Louis Harris* poll has shown The Observer to be one of the three most trusted newspapers in the United States. The others are *The Wall Street Journal,* also published by Dow Jones & Company, and *The New York Times.*

In this hurry-up world, a lot of people accept news as something to get on the run—or in between their favorite TV shows. The Observer is not for them.

But does it sound like the kind of newspaper that was meant for someone like you?

If so, we invite you to try *The National Observer* under a special trial subscription offer: 20 weeks for $2.67.

You needn't send any money now—we'll be happy to bill you later. Just mail the coupon. Do it today.

Send coupon now for special trial offer: 20 weeks for only $2.67.

The National Observer, 200 Burnett Road, Chicopee, Mass. 01021

Yes, I want to take advantage of your trial subscription offer. Please send me *The National Observer* for 20 weeks and bill me for only $2.67. I understand that's a saving of over 46% from the newsstand price.

☐ Check here if you enclose money order or check.

Name _____
(Please print)

Street _____

City _____

State _____ Zip _____

Satisfaction guaranteed: If not completely satisfied, you may cancel your subscription and receive a full refund on the balance.

2BC66

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

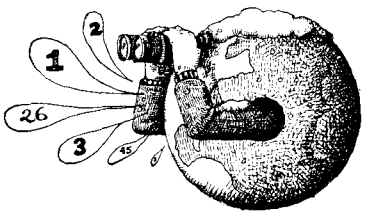
Saturday Review of Science

INDEX

JANUARY 1973 VOLUME LV, NUMBER 52

SR UP FRONT

5
O Come All Ye Bird Counters
By Robert Arbib
Will Freeport, Texas, Cocoa, Florida, or some California challenger emerge joyful and triumphant in the biggest ornithological bash of the year—the seventy-third annual Christmas Bird Count?



7
The Inventors' Fair
By Roy Bongartz
To the Concours Lepine in Paris every year come men who have invented hard-boiled-egg peelers, anti-burglar devices that sound alarms and stick stickers on thieves' foreheads—and occasionally something that works.

12
The Science of Being Santa
By Roger Rapoport
At the Santa Claus school in Oakland, California, it's not "On Dasher, on Dancer . . ." but "On Dial, on Certs, and on Brylcreem."

19
LETTERS

22
EDITORIAL: Apollo—The Gotterdammerung
By Alfred Meyer
Now that the Apollo moon missions are ended, can we say what they meant to us?

SATURDAY REVIEW SCIENCE is published monthly at $12 per year by Saturday Review, Inc., 380 Madison Avenue, New York, New York 10017. Application to mail at second-class postal rates is pending at New York, New York, and at additional mailing offices. Volume LV, Number 52. All rights reserved. Send all correspondence about subscriptions and remittance to: Subscription Department, Saturday Review, Box 2043, Rock Island, Illinois 61207.

Saturday Review, Inc., publishes a family of four monthly magazines—Saturday Review The Arts, Saturday Review The Society, Saturday Review Education, Saturday Review Science. Each of these special-interest magazines is available separately at $12 for one year, or all four may be purchased at the combined price of $24 per year.

SCIENCE

23
Air Structures: Inflatable Alternatives
By Joseph M. Valerio, Michael Davies, and Alan Stanton
Will the prime support material of your next home or office be the very air you breathe?

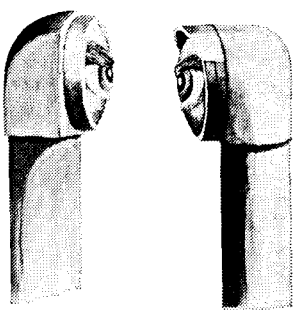
33
The Kingdom Where Nobody Dies
By Robert Kastenbaum
Freud dispelled the myth that children are innocent of sexual thoughts; now we learn that they have feelings about death, which crop up in the unlikeliest places.

43
Tambora and Krakatau: Volcanoes and the Cooling of the World
By Kenneth E. F. Watt
What a couple of volcanoes can teach us about air pollution.

45
Happy Birthday, Transistor
By Isaac Asimov
Dr. Asimov ushers in the second quarter century of a remarkable little gadget.

52
Guessing and Knowing
By Lewis Thomas
The most intelligent and optimistic look since Hippocrates at where medicine should be heading.

58
The Growing Clout of the Submarine
By Daniel S. Greenberg
Is the arms race thriving beneath the surface?



PHOTOGRAPHIC AND ART CREDITS:
Cover Ken Kay; pp. 5-18 Gene Calogero; pp. 25-32 courtesy Environmental Communications and Chrysalis; Photographers: Ant Farm, Chrysalis, Mike Davies, David Greenberg, Kinney Littlefield, Jack Shamikles, M. Sugihara, Roger Webster; pp. 33-36 Bunny Carter; p. 43 Free Lance Photographers Guild; pp. 45, 46, 47 right Ken Kay; p. 50 Bell Labs; p. 51 A T & T; p. 53 Werner Wolff, *Black Star*; p. 54-56 United Press International; pp. 58, 59 Richard Bennett; p. 62 Ivan Henry; p. 74 Charles M. Harrison; p. 75 United Artists Corporation.

SR REVIEWS

60
BOOKS

60
Combat in the Erogenous Zone
By Ingrid Bengis
Reviewed by Genevieve Stuttaford

61
Women and Madness
By Phyllis Chesler
Reviewed by Salvatore R. Maddi
The Pin-Up: A Modest History
By Mark Gabor
The Compleat Lover
By Derek and Julia Parker

62
Turkey Hash
By Craig Nova
Reviewed by Jerry G. Bowles

63
Trade Winds
By Alan Green

68
Shorter Reviews
Science and Controversy:
A Biography of Sir Norman Lockyer
By A. J. Meadows
Science and Technology in Art Today
By Jonathan Benthall
World Without Borders
By Lester R. Brown
The Making of a Psychiatrist
By David S. Viscott
Atlas of Animal Migration
By Cathy Jarman
Atlas of Wildlife
By Jacqueline Nayman
For Those I Loved
By Martin Gray

70
MUSIC: Tenorial Toast, Maazelian Verdi, Zylis-Garan Szymanowski
By Irving Kolodin

74
TRAVEL: An Evening With the Enchanted Mesa
By Patti Hagan

75
FILMS: The Bigger They Come
By Arthur Knight

76
DANCE: American Dance—the Heritage
By Walter Terry

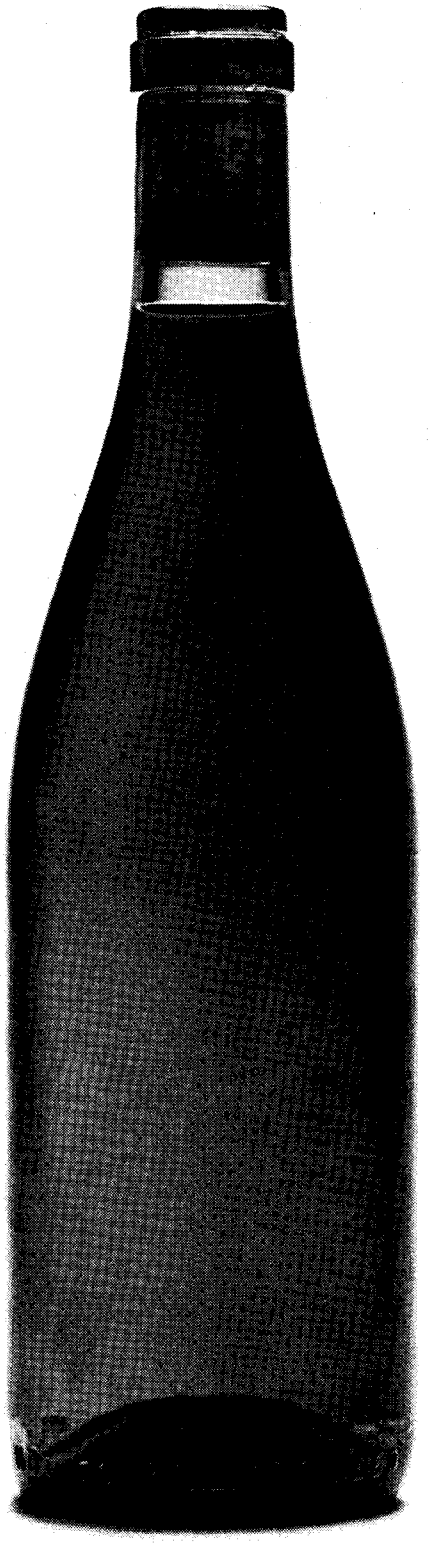
GAMES

57
Literary Crypt
Wit Twister

80
Kingsley Double-Crostic No. 2020

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

You can buy good French wine by the bottle. Or great French wine by the label.



The B&G label.

The one label that stands for the finest of wines from all the major vineyard regions of France. From Bordeaux, our classic Medoc, medium-bodied and dry. From Beaujolais, our popular light, fresh Beaujolais-St. Louis. From Burgundy, our brilliantly fruity Pouilly-Fuisse. From the Loire, our delicate and lively Muscadet. From the Rhone, our rich, soft Chateauneuf-du-Pape.

B&G. 36 great reds, whites and rosés. Produced only in the finest French tradition since 1725 by Barton & Guestier.

Why bring a good French wine when you can bring a great one? It's as easy as B&G.

B&G. Love Letters from France.

Barton & Guestier. 36 fine wines in one fine family. Imported by Browne Vintners Company, New York, N.Y. and San Francisco, CA.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

(Advertisement)

COMPLEX ARCHETYPE, SYMBOL, COLLECTIVE UNCONSCIOUS, INTROVERT, EXTROVERT—most of us recognize these concepts as having to do with psychoanalytic theory, but few of us know how they fit into the theories of Carl Jung or the full implications of Jung's ideas. In BOUNDARIES OF THE SOUL, June Singer draws on her considerable training and experience as a Jungian analyst to discuss the theory of Jung's psychology—and how it has been practiced.

In our super-rational world, where psychology is usually thought of as a "science of the brain," Jung's precepts are related to the true psyche—the soul. Like Jung, Dr. Singer believes that while psychology is a subject that surely has its scientific aspects, it is essentially beyond science. She deals not so much with what is known about the psyche, as with what is not yet known, and even with what may be forever a mystery. She takes her theme from a quotation from Heraclitus, the founder of metaphysics. "You would not find out the boundaries of the soul, even by traveling along every path: so deep a measure does it have." Her book is thoughtful and useful. Alan Watts, who read an early copy, wrote to us about the book:

"In a way, one might say that this book ought not to have been published, because it gives away the essential secrets of psychotherapy, and is from the pen of one of the great masters of the art."

L. L. Day
Editor-at-Large

BOUNDARIES OF THE SOUL: *The Practice of Jung's Psychology* ($10.00), by June Singer, is published by Doubleday & Company, Inc., 277 Park Avenue, New York 10017. Copies may be obtained from your own bookseller or any Doubleday Book Shop, one of which is located at 310 North 8th Street, St. Louis, Missouri 63101.

John J. Veronis
President
Editor-in-Chief

Nicolas H. Charney
Chairman
Editor-in-Chief

SaturdayReview

Editor
Nicolas H. Charney

Executive Editor
Ronald P. Kriss

Design Director
Donald K. Wright

SCIENCE

Managing Editor
Alfred Meyer

Senior Editors
Alan Anderson, Jr., Douglas B. Gasner, Frank Kendig

Art Director
John Isely

Assistant Editor
Ellen Weber

Associate Editor
Sally Bates

Contributing Editor
Barbara Ford

Staff
Gail Butterfield

Washington Editor
Daniel S. Greenberg

General Managing Editor
Robert Cowley

Book Review Editor
Eliot Fremont-Smith

Senior Editors
Charles E. McLaughlin, Jon Swan

Music Editor
Irving Kolodin

Associate Book Review Editors
Philip B. Flamm, Joseph A. Kanon, Genevieve Stuttaford

Contributing Editors
O. L. Bailey, Benjamin DeMott, Alan Green, Henry Hewes, Arthur Knight, Karla Kuskin, Sally Lindsay, Richard Poirier, Peter Schrag, Walter Terry, Brian Vachon

Assistant Editors
Anne Horn, Barbara King

Copy Editor
Caroline Stevens

Letters Editor
Ava Swartz

PRODUCTION STAFF Robert Boylan, *Copy Editor*; Joel Homer, Michael Schrader, *Copyreaders*; Harrie George, *Photo Research*; Sandra Forrest, *Design Assistant*; Fumio Kobayashi, *Production Artist*; Tierney Picardal, William Rose, *Production Associates*

ADMINISTRATIVE ASSISTANT Gail Barnet

GENERAL STAFF Marilyn Kelso, JoAnne White

STAFF SERVICES Irving Armstrong, Mary Hanson, Vincent Hollins, Humberto Ramirez

THE ARTS John Poppy, *Managing Editor*; Neil Shakery, *Art Director*; Phyllis Seidel, Edmund White, *Senior Editors*; Jim Gaines, *Associate Editor*; Marilyn Bethany, Patrick Merla, Ronald Najman, *Assistant Editors*; Dale Harris, *Contributing Editor*; Hildegard Kron, *Administrative Assistant*

EDUCATION David W. Cudhea, *Managing Editor*; Catherine Flanders, *Art Director*; James Cass, *Consulting Editor*; Peter A. Janssen, Henry S. Resnik, *Senior Editors*; Sheila Canning, K. C. Cole, *Associate Editors*; Mary Jo Bane, Malcolm Scully, *Contributing Editors*

THE SOCIETY William H. Honan, *Managing Editor*; Wade Greene, Richard M. Levine, Lynne Williams, *Senior Editors*; Russell Schoch, Jr., *Associate Editor*; Peter Hauck, Edith Lorillard, *Assistant Editors*

Publisher
Robert J. Moore

General Business Manager
Nicholas Listorti

Production Director
John Ahrens

Philip Broselofsky, *Controller*; Allen Roberts, *Personnel Director*; Bob Harrington, Joe Sullivan, Gary DeJong, *General Business Staff*; Diane Fagon, *Personnel Administrator*; Carolyn Nadler, *Personnel Assistant*; Sandy Bernstein, *Assistant to the Treasurer*; Rodolfo Alandy, Theresa Contrada, Nancy Gruber, Barbara Levasseur, Sue Thompson, *Staff*

Circulation
Mark Edmiston, *Director*

John Klingel, John Ladd, *Managers*; Penny Ertelt, Carla Graubard, Gregory Cascante, Harry Sears, *Staff*,

Advertising Director
Peter Veronis

H. Ray Winship, *Promotion Director*; David Larkin, *Research Director*; William Lieberman, *Associate Manager*; Roberta Adams, Bernard Ganis, Charles Harris, Walter Koontz, William Pearson, William Rosen, Richard Setti, Duane Spong, *Category Managers*; Virginia Medina, *Advertising Services*; Marilyn Hiris, *Advertising Production Coordinator*; Eleanor McAvoy, *Classified Advertising Manager*; Carol Aiello, Carol Andrie, *Staff*

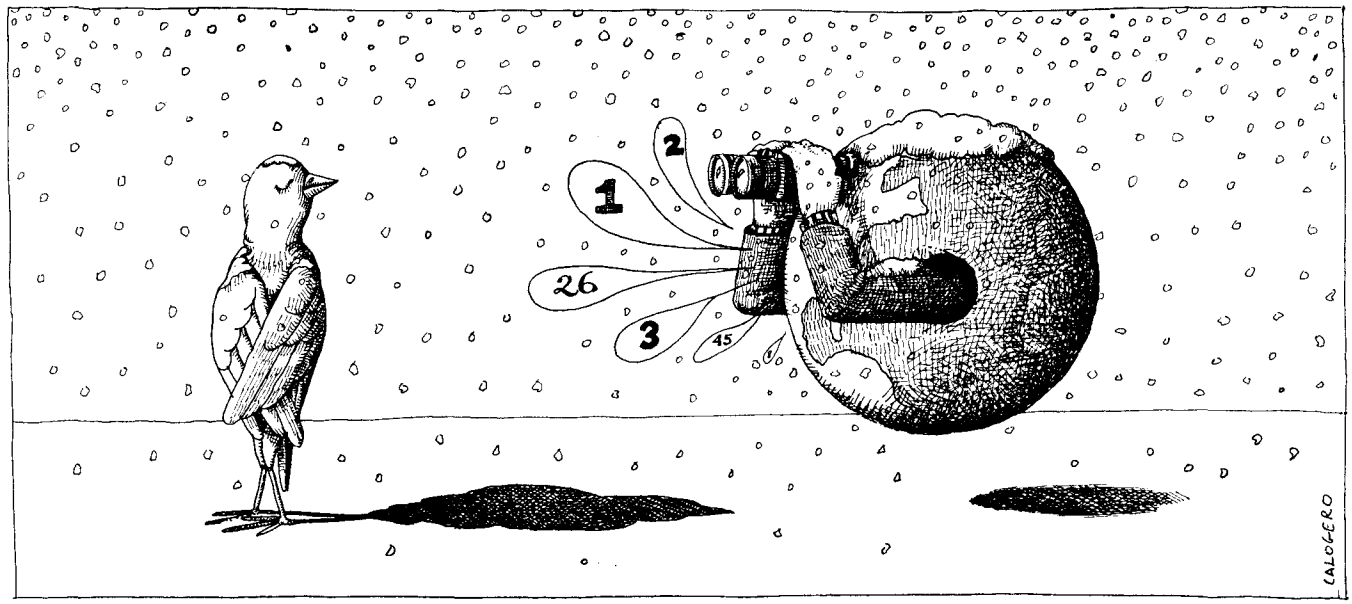
National Sales Staff Frank Zilla, *Chicago Manager*; Granville Swope, *Los Angeles Manager*; Leonidas Contos, *New England Manager*; Sanford Heckinger, *San Francisco Manager*; Helen Andreadakis, Lenore Friedman, Frederica Piotkin, Carol Smith, Mary Thielo, Shirley Watler, *Staff*

Publishing Director
William D. Patterson

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

SR UP FRONT

DECEMBER 23, 1972



O Come All Ye Bird Counters

BY ROBERT ARBIB

NEW YORK, N.Y.—Will Freeport, Texas, win it all again this year, or will long-time champion Cocoa, Florida, regain its lost crown? Will erstwhile record holder San Diego snap back from last year's slump? Can Vancouver repeat as the superteam of Canada?

Our subject is the longest-running, farthest-ranging, most popular, least-understood sporting event of the year. It's an annual exercise in mass masochism, regional chauvinism, and outerwear exhibitionism known as the Audubon Christmas Bird Count. For 20,000 of North America's birdwatchers, it's the Super Bowl, World Series, and Kentucky Derby all rolled into one.

At this moment, in preparation for the biggest birding bash of the year, teams from the Aleutians to Newfoundland and from Hawaii to the Virgin Islands are meeting to organize their game plans, polish their optical gear, and do whatever needs to be done to ready kayaks, marsh buggies, fishing boats, air boats, airplanes, helicopters, bicycles, golf carts, cars, trucks, jeeps, and even the old-fashioned feet that will take them out to wherever the birds are at Christmas time.

Last year almost 19,000 birdwatchers, from the ages of two months (backpacked in Texas) to well over eighty-five, took part in the Christmas count. One man, Charles H. Rogers, of Princeton, New Jersey, who looks more like George Washington than does the portrait on the one-dollar bill, has participated in seventy-one of the seventy-two counts. Briefly hospitalized in 1969, Rogers had to be forcibly restrained from jumping bed and slipping off into the bush. Other old-timers boast forty, fifty, and sixty years of participation.

This epidemic winter madness started in 1900, when Frank M. Chapman, the ornithologist who edited the Audubon Society's *Bird Lore* magazine, suggested a substitute for the hunters' traditional Christmas-time massacre, the "side hunt." As Chapman wrote, "It is not many years ago that sportsmen were accustomed to meet on Christmas Day, 'choose sides,' and then . . . hie them to the fields and woods on the cheerful mission of killing practically everything in fur and feathers that crossed their path—if they could." "We hope," added Chapman, "that all our readers who have the opportunity will aid us in making [the new bloodless sport] a success by spending a portion of their Christmas Day with the birds and sending us a report of their 'hunt' before they retire that night."

That first year twenty-six persons in twenty-five groups responded to Chapman's challenge. The longest list reported was from Pacific Grove, California: thirty-six species. Chapman himself took second place, reporting eighteen species from Englewood, New

Robert Arbib, who edits American Birds, *is the author of* The Lord's Woods, *which won the John Burroughs medal for the nature book of the year.*

ILLUSTRATIONS BY GENE CALOGERO

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Jersey. Charles Rogers began his virtually nonstop saga in New York City's Central Park with a modest total of six species.

It was not exactly an auspicious beginning, but the madness spread. When Chapman retired in 1942, his brainchild had grown into an institution, and in that year no fewer than 327 groups, totaling 2,400 observers, competed in what was becoming an ever more competitive exercise. By 1971 the number of counting groups (known as counts) had reached 963, and this year it may, like the Dow Jones Industrial Average, top 1,000 for the first time. In almost every year since 1900, totals of counts, observers, species, and the number of birds seen have risen. In addition, the rules have gradually been formalized. Each group is now confined to a search area with a fifteen-mile diameter, and the search is restricted to any one calendar day within a two-week period centered on Christmas. Methods of reporting the results of the count have been standardized to give them more scientific value.

The people who happily give up a day of their Christmas holidays, or Christmas itself, and pay a one-dollar participation fee for the privilege of slogging through mud and sand, or of plodding through rain or snow, or of risking their necks on mountain peaks to count wild birds are not all crazy—despite appearances. Some are scientists and conservationists. Others are senior museum figures—for example, Dean Amadon of the American Museum in New York, Kenneth Parkes of the Carnegie Museum, and S. Dillon Ripley of the Smithsonian Institution.

The mass of Christmas bird counters, however, are dedicated amateurs—school teachers (lots of them), taxi drivers, housewives, writers, farmers, airline pilots, bankers, school children, and military servicemen. (Last year one participant was a Doberman Pinscher named Saba von Sturzbach. Saba was credited with flushing several hard-to-stop marsh birds for its Cornell University team.) More men take part than women, although birding is still looked upon in some circles as an effete pastime.

This is nonsense, of course. Birding can be far more taxing than many true "sports." In Alice, Texas, three men and two women spent all day on foot, walked ten miles through fields and woodland, and logged fifty-three species. At the Seedskadia Refuge in Wyoming, Merle Bennett and Jim June braved 20-below temperatures to find fourteen species. Most dedicated of all, perhaps, was the group of nine men and women who climbed to the summits of Mt. Rogers and White Top Mountain in the Great Smokies of Virginia. Sixteen miles round trip, in sleet and rain, for the meager reward of forty-two individual birds of ten species!

At the other extreme, of course, are those people along our southern and California coastlines who enjoy balmy weather and concentrations of a great variety of birds. Of the thirty-two teams that managed to find more than 150 species in their respective areas, twenty-four were from California, Florida, and Texas. The park naturalists and their helpers who scour the mangrove swamps and buttonwood hammocks of the Coot Bay–Everglades area listed 152 species, many of them spotted in waterways from government launches or in ibis and heron colonies from an airplane. Across the Gulf of Mexico at the Aransas National Wildlife Refuge the total was only 144 species, but one of them was a flock of whooping cranes, the last wild survivors of this species on earth. In a far different setting the group working the mountainous Sespe Wildlife area in central California managed to find ten California condors, a species equally close to becoming extinct.

I well remember my own first Christmas count. The date was December 26, 1930, and I was a member of an all-boy bird club at my school in suburban Long Island. Nine of us were out that gray, rain-spattered day—on foot, on bicycles, or crammed into our science teacher's rattling Chevrolet—to scour the marshes, bays, and woodlands of our area. We were up before dawn and out until after dark. When we gathered at our teacher's house to tally the results, we had identified a grand total of forty-eight species! That, as it turned out, was the lowest number we ever recorded. Over the years, as we added new participants and improved our skills and mobility, the totals grew dramatically. Last year fifty of us found 129 species in our southern Nassau County area, and the forty-two-year cumulative total is close to 200 species—remarkable for an area at that latitude in late December.

Christmas counting means more to most of us than merely a day in the field. Some of the pleasure is the companionship of old friends as we plough through the brambles and across the dunes by day and meet for the ceremonial dinner after dark. Following dinner, the compiler calls the roll of species, with each party leader giving his group's total, and a final tally is made.

The southern Nassau count is rather informal in organization as compared with such superpowers as Cocoa, Florida, and Freeport, Texas. Allen Cruickshank is the field marshal at Cocoa, and he carefully selects his team from the ranks of experts all over the continent. In Freeport Victor Emanuel musters an army of eighty-five or more for a meticulously planned campaign. Advance parties scour the terrain for days in advance, "staking out" the rarities so that they can be easily chalked up on counting day. (This is easier in southern areas, where birds tend to wander less than they do in the North.) Only the most aggressive birders are selected as party leaders. Walkie-talkie radios provide interparty communication; dogs are used to flush game and marsh birds; and tape recorders carrying the calls of secretive species are used to lure the choice varieties, such as rails and owls.

All the strategy paid off last year for Victor Emanuel: his Freeport count set a new world's record of 226 species, a simply fantastic number of different birds to find in winter in one small circle of land and water. Cruickshank could do no better than fourth, with 198 species. Ahead of him were Santa Barbara with 202 and Point Reyes, California, where a huge team of 193 observers, which must have trampled every square foot of those lovely moorlands, reported 200 species.

Apart from the physical pleasure of the day afield, the spiritual pleasure of the companionship, the intrigue of the hunt, and the fierce competition, both with other groups and with your own past record, the great Christmas count yields information of considerable scientific value. By locating our wintering species and estimating their numbers, we can begin to map the continental distribution of our bird life. We can get an inkling of where certain species are increasing or declining. We can determine the areas of greatest abundance for each species and try to determine the reason. We still don't know why Cincinnati always lists more cardinals—2,489 last year—and downy woodpeckers—508—than any other area in the country.

Christmas counts can give us firm figures on some of our rarest species, as well as a good indication of what our most abundant birds are. Last year, of the 64 million birds counted, no fewer than 80 per cent were starlings, blackbirds, and house sparrows. The single most abundant species was the red-winged blackbird, which numbered 21 million. Second was that aggressive British immigrant, the starling, with 13 million. The common grackle at 10 million and the brown-headed cowbird at 5 million were the other species over the million mark.

Without some hard organizing, the

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

mountainous mass of information gathered each year could easily rank as one of the world's great irrelevancies. Obviously, it is of little use to any serious scientist unless it is critically edited and published somewhere. That somewhere is the National Audubon Society's magazine for birdwatchers, *American Birds*. All the acceptable counts, with each record carefully considered, are published in that magazine's April issue, a monstrous, 414-page (last year) compendium that rarely manages to reach its eagerly awaiting audience before June. Here every count is recorded: where it was, where it went, what kinds of habitat it covered, what were the weather, ground, and ice conditions, how many hours were spent afield, how many miles were covered (and by what means of locomotion), and what numbers of what species were seen. At the end comes the list of participants, each of whose one-dollar fees helps pay for the printing.

Where it will all end is anybody's guess. Since Central America and the West Indies have been admitted for the first time this year and new groups from other areas are joining the campaign, there seems nothing to bar the way to a 2,000-count or even 3,000-count Christmas. And when that day comes, new and perhaps computerized methods of handling the information will have to be devised. We are already planning for such a deluge, determined not to let success kill our crazy Christmas carnival. □

The Inventors' Fair

BY ROY BONGARTZ

PARIS, France—As you push your way down the aisles between rows of exhibition stands, a gray-haired gentleman behind one of the stands reaches down, takes off his shoe, and waves it tantalizingly under your nose, calling out, "Smell it, smell it, *monsieur!*" At another display a demonstrator waggles his finger at passersby to draw their attention, then presses a button on the bottom part of a telephone. Immediately, from a point about a yard to the right of his head, the handset part of the phone swings on a bracket in a fast arc, stopping half an inch short of knocking his teeth in, at which point the demonstrator pretends to answer a call: "*Allô? Oui?*"

This is the inventors' fair in Paris, an annual and mainly joyful congress of that peculiarly French breed of old-time potterers and tinkerers, the *bricoleurs*, who every year since 1901 have met to show off their latest brainstorms. Called the Concours Lépine, after its founder, Louis Lépine, a Paris chief of police who wanted to help local artisans by organizing a show of toys and *articles de Paris* (fancy goods), the exposition was held for many years in the ornate Victorian Grand Palais. Then, with the rise of big corporations and team research, traditional individual inventing, or *bricolage*, fell into a decline, and the inventors' fair had to make do with outdoor tables along the banks of the Seine. But for the past several years the sprawling Fair of Paris, held every spring out at the Porte de Versailles, has more or less grudgingly given the inventors' fair a salon of its own. This year some 135 contestants vied for such honors as being awarded gold, silver, and bronze

SPELLright

THE MOST ADVANCED PRODUCT SINCE THE TYPEWRITER WAS INVENTED! NO MORE ERASING. COVERS MISTAKES INSTANTLY AND QUICKLY!

TOTALLY NEW -
SELF CORRECTING TYPEWRITER RIBBON

This is the most needed advance since the typewriter was invented. Every messy, smeary typewriter eraser hits the waste basket. No more erasing. The bottom half of this marvelous ribbon makes errors disappear without erasing. To make your correction back space, shift ribbon selector, and retype the error. The white ink makes the error completely invisible. The ribbons make excellent gifts. NO COD's. Cash, checks, or money orders.

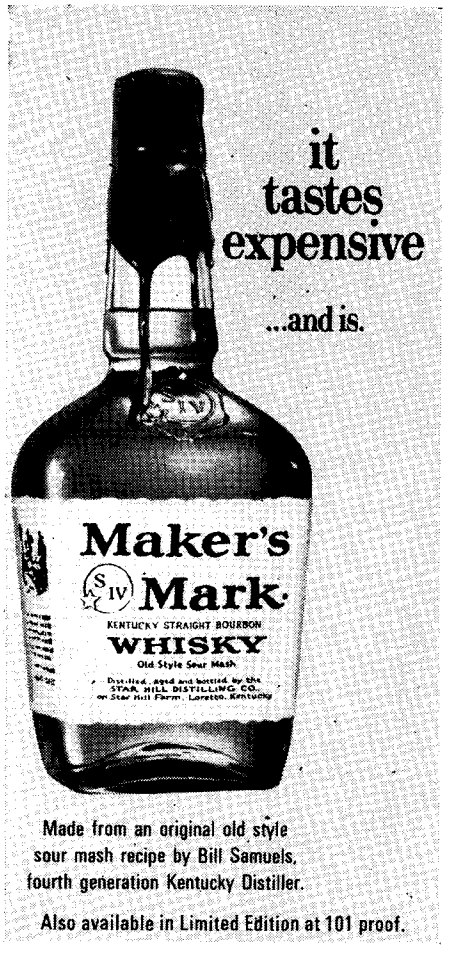
Please send me the quantity of ribbons checked below. If not satisfied, I will return ribbons within 10 days for full refund.

- ◯ 1 RIBBON $3.25
- ◯ 2 RIBBONS $5.75
- ◯ 3 RIBBONS $8.00

INTERNATIONAL MERCHANDISE MART, INC.
P. O. BOX 1621
SHREVEPORT, LOUISIANA 71164

Brand Name of Typewriter _____
◯ Standard ◯ Electric ◯ Portable
Name _____
Address _____
City _____ State _____ Zip _____

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



Made from an original old style sour mash recipe by Bill Samuels, fourth generation Kentucky Distiller.

Also available in Limited Edition at 101 proof.

90 proof • Star Hill Distilling Co., Star Hill Farm, Loretto, Ky.

Buy

U.S. Savings Bonds

LEARN CHESS

Learn chess by recorded instructions. Let Al Horowitz, N.Y. Times Chess Editor, teach you how. No need to study involved diagrams or memorize complicated moves. He'll have you playing your first game within minutes.

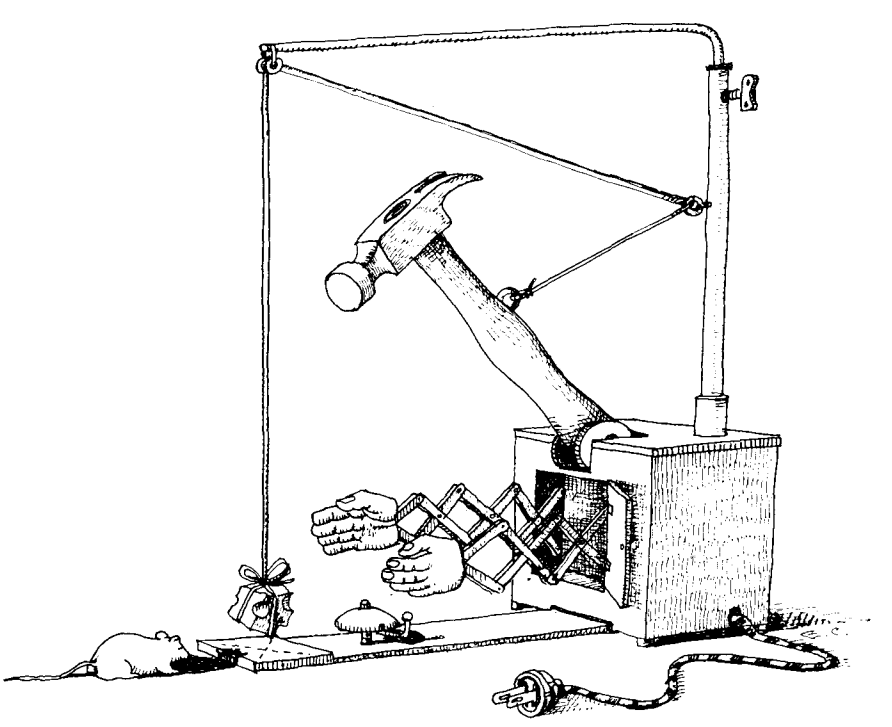
Your chess tutoring kit includes:

12-inch LP Instruction Record
Chess Board
32 Tournament-Size Chessmen

$6.50 post paid

A superb gift in a Deluxe Box Set. Satisfaction guaranteed. Order now for Holiday delivery.

MUSIC MINUS ONE Dept. SR1272
43 W. 61st St. New York, N.Y. 10023



medals or of having their names inscribed on loving cups or silver bowls.

Mainly, however, they hope to sell or lease their patents or to find a manufacturer who will back them in some kind of partnership, preferably an American or German manufacturer, because inventors have given up on their own countrymen. "The press in France does not take us seriously," complained an inventor of a machine that shoves paper bags for supermarkets one at a time up out of a slot (thus saving the checkout clerk two seconds per bag). Indeed, most of the estimated 300,000 visitors to the Paris Fair who wander among the confusion of neighboring exhibition rooms seem unable to grasp just what is going on in the Concours Lépine. And so they trot past many inventors who stand ignored yet ready to jump into action at the least sign of interest.

Such a one was Emile Kimmerlé of Belfort, who had been dozing by his apparatus but quickly awoke to show me how it worked. Basically, it is a cupboard with a door on it, representing a safe or any other locked-up space. Now Kimmerlé pretends to be the thief, yanks open the door—and all hell starts to break loose. First a loudspeaker, to be installed on the outside of your house, out of earshot of the unsuspecting burglar, shouts (in Kimmerlé's voice): "*Il y a un voleur dans cette maison!*" Then tear gas sprays out onto the *malfaiteur* (evildoer), followed by *another* spray of little round, red stickers that adhere to the thief's face. Each one reads "*Voleur*" (thief). They are so sticky that they cannot be removed before the arrival of police, who have, of course, been called to the scene by the loudspeaker. (As the fair closed, Kimmerlé was still looking for a manufacturing partner.)

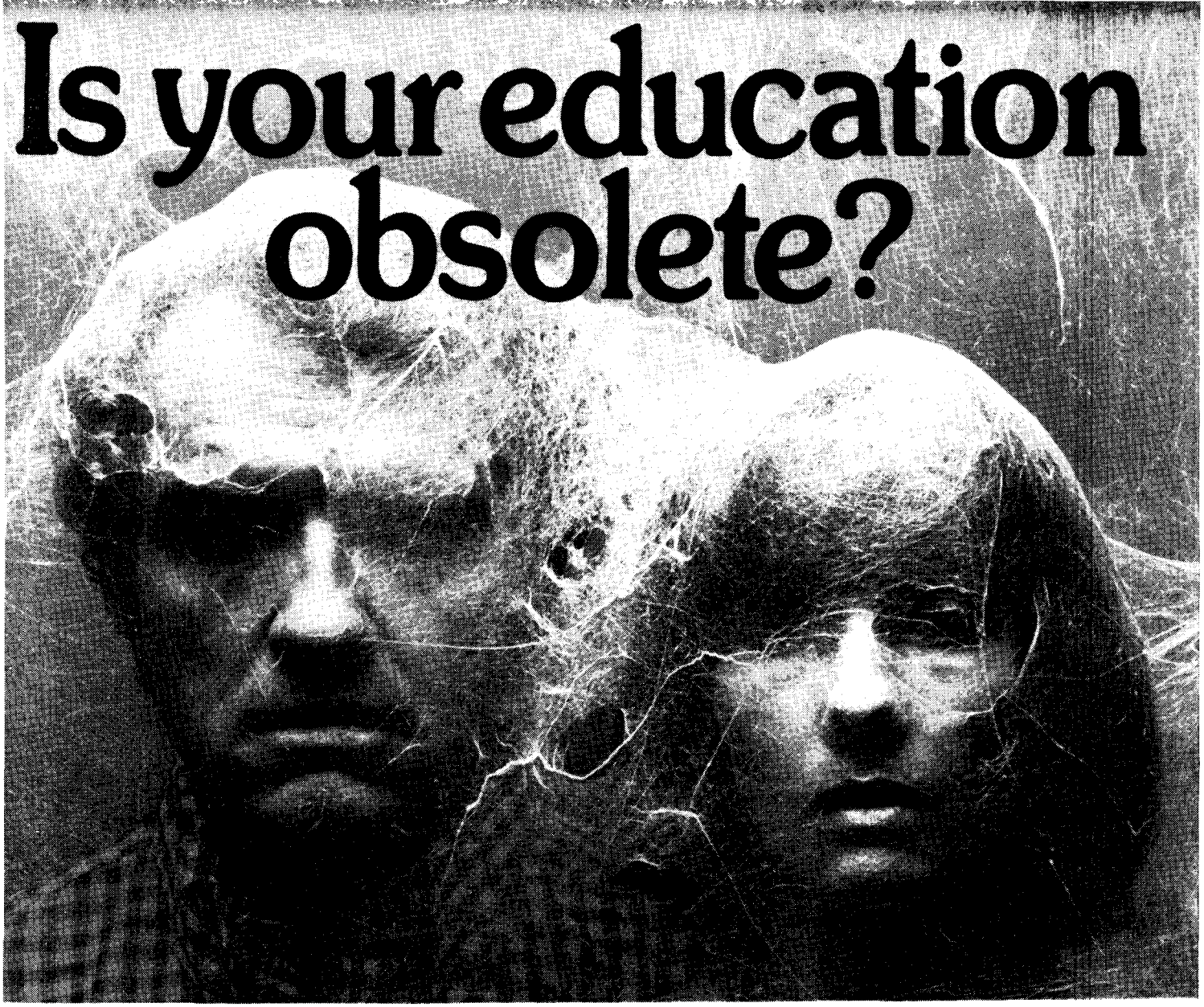
A large crowd surrounded a chubby young man, Robert Jean Hily of Paris, who was demonstrating a hard-boiled-egg peeler. Called the *Decoqmatic*, Hily's peeler consisted of a three-tined fork with the middle tine bent a bit out of line. The inventor was shelling eggs at a great rate and selling his gadgets like hotcakes, until he made the mistake of asking his mother to take over for a few minutes while he took a break. Mme. Hily made a botch of two dozen eggs, mangling and pulverizing them with the fork, before her son rushed back to save his business. "I just don't have any gift for that kind of thing," Mme. Hily said, by way of apology.

Raymond Ravé of Ille-sur-Tet had a modest success with his "object to neutralize every disagreement in a card game"—a single cube with a club, diamond, heart, and spade on four of its six faces, to be used to keep track of what's trumps. Louis Flament of Paris was widely admired for his squares of rubber, to be attached to the earpieces of a man's eyeglasses while he shaves. In a brochure that Flament handed me, I read: "The invention's purpose is to facilitate the delimitation and the sym-

Roy Bongartz is the inventor of, among other works, a collection of stories called Twelve Chases on West Ninety-ninth Street. *He lives in Rhode Island.*

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Is your education obsolete?



Education, like fresh rolls, goes stale.

And in today's Knowledge Society, the problem is not getting new information: it is developing new ways to learn, and to apply new knowledge.

Saturday Review/Education is designed to help with this process.

It explores the joy of learning, and raises fundamental questions about the existing educational system, and the new revolutionary directions it might take.

There is more to educational change than turning blackboards green.

Here are some of the things you will read about in Saturday Review/ Education:

¢ Are "educational" toys really educational?

¢ Should schooling be compulsory? Direct reports from states where it is not.

¢ Children's TV. A guide to the new season that parents, and educators can really trust.

¢ Changes in mass "higher education."

¢ Continuing education beyond college.

¢ Do "crash courses" for College Boards really help?

¢ The "blue-collar" colleges: as open admissions becomes policy in many colleges, what experience from the past will be significant?

¢ The effect of the counterculture on learning in America.

¢ Retraining workers who have been automated out of jobs.

¢ The Union Merger Movement: Will 3,500,000 teachers put it together?

¢ Economic and social systems in the public school micro-society.

In addition, Saturday Review/Education will carry puzzles, features, reviews, and editorials designed to broaden your scope and sharpen your wits. There is lavish use of color and new graphics throughout, in a very exciting total presentation.

We invite you to become a subscriber at the half-price introductory charter rate of $6 for one year.

The regular rate is $12 for 12 issues.

Saturday Review
Box 2043, Rock Island, Ill. 61207

Dear Saturday Review,

Enter my introductory subscription to Saturday Review/Education at the Half-Price Charter Subscription rate of $6.00 for one year (12 issues – regularly $12).

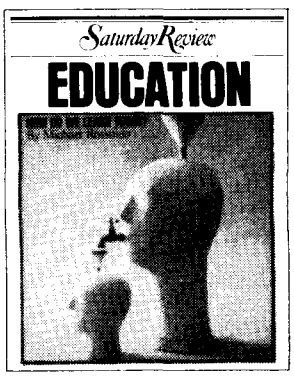
☐ Payment Enclosed ☐ Bill me
(offer good only in U.S. and Canada.)

Name _____

Address _____

City _____ State _____

Zip _____ BEA2M509



If you are currently a subscriber to Saturday Review, SR/EDUCATION is already included in your subscription as part of SR's new total information program covering the arts, science, the society, as well as education

REPRODUCED BY PROQUEST LLC UNDER LICENSE WITH THE COPYRIGHT OWNER
ELECTRONIC REPRODUCTION PROHIBITED

metry, on the two longitudinal halves of the face, of the sideburns, by the effect of a guided shave, thanks to these movable objects." The man plaintively holding out his shoe for people to smell was Armand Vidal, another Parisian, whose camphor-impregnated innersoles were guaranteed stinkproof—*imputrescible*. To install them, you place glue on toe and heel of the innersoles, slip them into your shoe, put on the shoe, and stand motionless for two minutes.

René Pelligrini of Villejuif showed a marvelous lighted-up board with hundreds of wires going into it, designed to signal the presence or absence of tenants of apartment buildings or hotels—an invention mainly of interest to concierges; and Raul Rocaboy of Paris drew acclaim for his "world's smallest five-door car," weighing 900 pounds—until he admitted that he had no motor for it.

Even as the early inventors were drawn to aviation, today's *bricoleurs* are concerned with the automobile. Emile Toussaint of Noisy-le-Grand, for example, invited visitors to try out his anti-finger-slamming gadget for car doors; he had a whole car door mounted in a frame ready to slam. Eventually a wary believer stuck a little finger into the doorjamb, and Toussaint tried to slam the door, but mysteriously it was blocked. (An electric switch activated by a short circuit caused by the touch of a finger on a contact wire lining the door frame moves a block into the area of the hinge.) Joseph Chouvac of Gélos had long been troubled by the inside of his windshield's steaming up; he solved this problem when he dreamed up the obvious, yet patentable, idea of attaching a second wiper blade to the wiper motor so that it wipes the inside of the glass. Marcel Chauvaud of Luxe presented a translucent plastic sun visor to cut out blinding rays, but it had the disadvantage of making the road all but invisible. More interesting was a gadget from Florian Serban of Paris: a spinning disc with radial slots, to be spun right in front of your eyes, while driving at night in order to cut down on headlight glare from oncoming traffic. André Goury of Lucquy proved to be a *bricoleur par excellence*. He was showing an antitheft device that could be used on cars. When the device is on and a car door is opened, the broken contact triggers a firing tube to "send out some object making a good deal of noise when it falls, or it could tip over a container of some smelly liquid or powder that, spilling on the thieves, would then make it easy to discover the number of the thieves, and even their corpulence, and thus make identification easy." The question of how Goury's device could give information on the corpulence of thieves puzzled certain fairgoers, but the answer was simple enough: the telltale liquid or powder, sprayed without warning from a car being broken into, would *outline* the thief, and some of it would spill onto the ground. A fat thief would absorb a lot of the stuff, leaving little of it behind, while the opposite would hold true for a lean thief.

A one-legged inventor, Giuseppe Ceccarelli of Fresnay-sur-Sarthe, showed an artificial knee-joint with a safety lock that snaps on in case the wearer stumbles, so that he can avoid the fall that would ordinarily take place when the mechanical leg folds up under him. A special jumping bed, the work of S. Di Mascio of Paris, is guaranteed for twenty years, even if you encourage your children to jump on it. It consists of a tough spring frame and a mattress, and Di Mascio distributes a picture of his invention that shows a properly dressed but wanton-eyed young woman bouncing on it. Bicyclists and motorcyclists were intrigued by goggle wipers run by a small generator attached to a moving wheel, as well as by a blinking electric glove for use in signaling turns.

Games were represented, including a modified Ping-Pong called "room tennis." It was similar to Ping-Pong in most respects, except that "the table [is] modified, so that one-half of it remains horizontal, but the other half is vertical, for bouncing the ball off of." Sports equipment included a camp table that turned into a bed and a boat that turned into a duck blind.

Little was overlooked by the imaginative *bricoleurs*. One brought in a sharpening machine for surgical instruments; another, a short tube with mouth-shaped openings on each end, for use in mouth-to-mouth resuscitation. Pierre Thuillier of Lavit had a calorie recuperator in the form of a covered metal jacket to close around a gas burner and a cooking pot and thus save heat otherwise lost.

Yet in spite of this turnout French inventor circles are hardly encouraged about the future. Says the publications director of the French Association of Inventors and Manufacturers, Jean Widlöcher: "France has gone in a few decades from first to eighth place among inventing nations." His remedy would be to change French laws so as to benefit inventors now deprived of profits from their work. "While the author of a song may get rich," says Widlöcher, "the independent inventor ruins himself financially and as a result often slips into despair."

Widlöcher warns the French public not to forget the old truism: "There can be no inventions if there are no inventors." Fair visitors may, nevertheless, find him rather pessimistic. Did they not behold and perhaps try out an almost-perfected automatic oyster opener? Were they not regaled by the wonderful squiggly striations made by a simple piece of cleverly corrugated rubber that, when drawn over a coat of wood-stain brushed onto a board, created any kind of wood-grain imitation your heart could desire? Did they not have reassuring memories of the world-famous French Moulinex line of electric mixers, which came out of an original entry here? Or of other Concours Lépine successes of the past: a radio receiver, sixty years ago, that could write down its own messages on a revolving cylinder; a ballpoint pen as far back as 1920? Who knows which modern opus the wand of fortune may strike among the brilliant prototypes this year? Nobody knows, and nobody is actually even guessing. But if you *had* to guess, you might pick Pierre Corenwinder of Le Havre and his hydraulic pendulum motor. It runs but causes no pollution. It doesn't even use batteries. It simply uses the energy of the rotation of the earth!

Cheer up, Widlöcher! With men like Corenwinder still at large in France, you have nothing to fear. □

The Science of Being Santa

BY ROGER RAPOPORT

OAKLAND, Calif.—Mrs. Gail Plowe slapped her hand on a red velveteen suit trimmed with white fur as she addressed her students: "Now, class, under no circumstances does Western Girl tolerate 'Ho, Ho, Ho'-ing from our Santas. You'll frighten the smaller children right out of the store. Try to remember you're in there as a customer draw. A Santa can make or break a store at Christmas time."

Mrs. Plowe's twenty-two Santa trainees shifted uneasily in their chairs at the Oakland office of Western Girl, the international temporary-employment agency. They ranged from eighteen to seventy, from the unemployed to the retired. But primarily they were hirsute, young college students eager to make a few hundred extra dollars by playing St. Nicholas. Theirs was one of seventy-five pre-Christmas Santa schools conducted across the country by Western Girl's Santa Division. With

Roger Rapoport, let's face it, is the reincarnation of Scrooge. He lives and works in El Cerrito, California.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

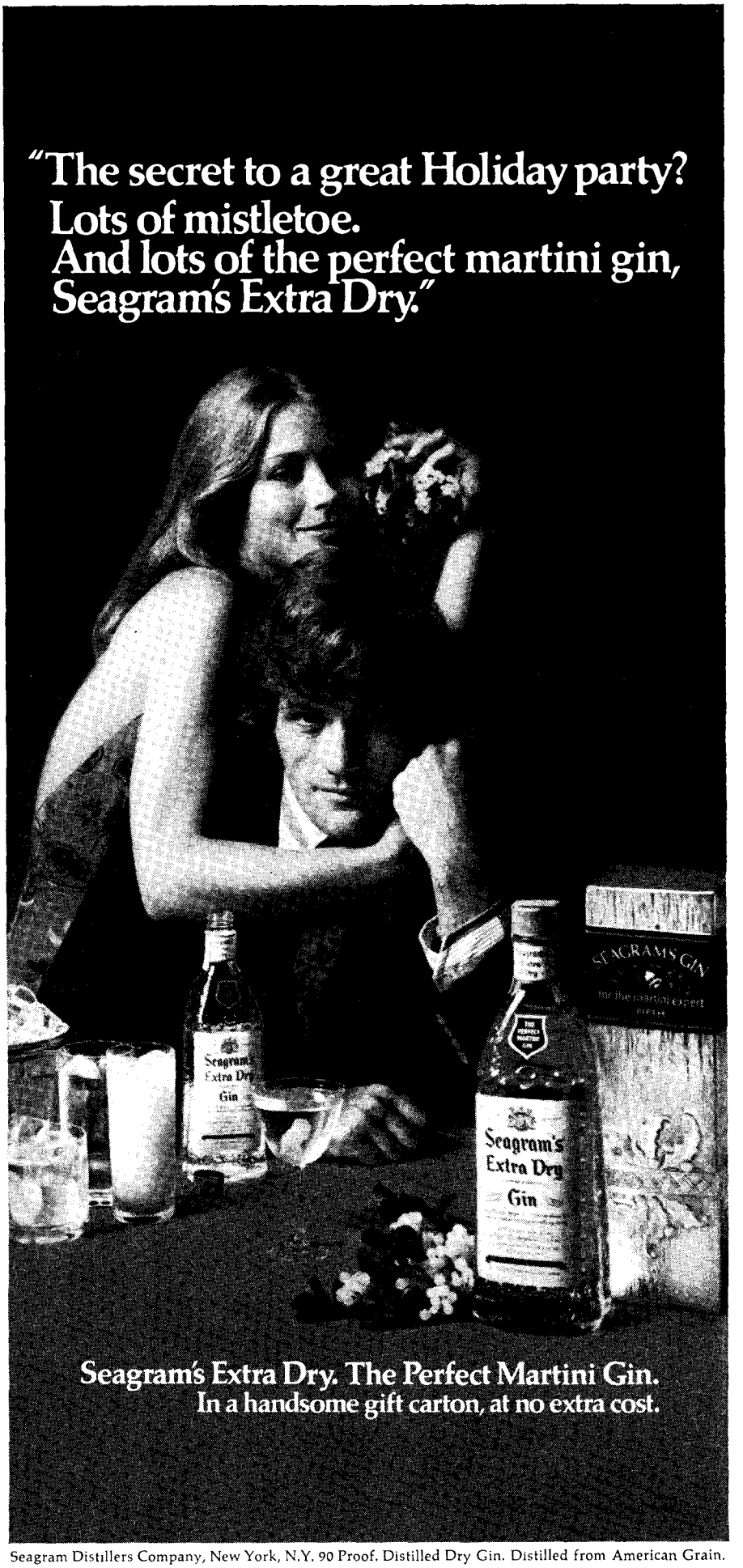
a full-time Santa selling for $1,200 to $1,500, the company expects to gross roughly $500,000 on the rental of 500 full- and part-time Santas this season.

Western Girl has become the nation's largest supplier of Santas, thanks in large part to a comprehensive training program pioneered by Richard Westerman of the North Pole Santa Claus Rental Agency in Los Angeles. Three years ago Western Girl bought out the North Pole Agency and took Westerman's total-service-Santa concept national. Today a store anywhere in the country can rent a fully trained and costumed Western Girl Santa, "bonded to $100,000 and covered with $1 million worth of insurance for bodily injury and property damage." In case of illness a backup Santa is available. This approach has yielded an average annual sales gain of 30 per cent, as such department-store chains as Sears, Ward's, and Penney's rent more and more Western Girl Santas each year in order to free themselves from the headaches of the Santa business.

The temporary employment agency screens carefully; only one out of every twenty-three Santa applicants is selected. A week before Thanksgiving matronly Mrs. Plowe stressed this point to her Oakland students: "Age and weight have very little to do with your being here tonight. When you get dressed up in the suit, about all anyone can see is your eyes. All of you have been chosen primarily because of that essential twinkle in your eyes." Her students blushed and winked at each other.

Mrs. Plowe glanced down at her thick, red Santa manual and continued lecturing: "There are several ground rules you must observe to stay in the Santa corps. I don't want to catch any of you with a bright red nose brought on from nipping at a bottle of Old Grandad. You're not allowed to flirt with the young women who work as Santa's helpers. Please remove your beard before you light a cigarette, or it might catch fire. Don't let the kids catch you smoking.

"If you're not working, don't let the kids see you in a Santa suit. Don't be like the off-duty Santa who brushed a friendly child aside, grumbling, 'Go away, little girl; I'm not on until the afternoon shift.' When you change shifts with another Santa, make sure that you are back in the dressing room before your replacement shows up in front of the children—it confuses the kids when they see two Santas at the same time. And please, please, pay attention to personal hygiene. We had to send one Santa home last year because of b. o. So remember, it's: 'On Right Guard,


"The secret to a great Holiday party?
Lots of mistletoe.
And lots of the perfect martini gin,
Seagram's Extra Dry."
SEAGRAM'S GIN
Seagram's Extra Dry Gin
Seagram's Extra Dry. The Perfect Martini Gin.
In a handsome gift carton, at no extra cost.
Seagram Distillers Company, New York, N.Y. 90 Proof. Distilled Dry Gin. Distilled from American Grain.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

What's happening to the WORLD? An open letter to readers of the Saturday Review.

People have been asking questions about WORLD Magazine—the magazine about ideas and the arts in a world setting.

They want to know whether we have been able to achieve our stated purpose; namely, to finance our magazine primarily not through outside investors but through our readers. We hoped we could find enough readers who would be willing to take a chance on us by subscribing in advance at full-rate and for long-term.

What happened?

We have now published over 12 issues. (We appear every other week.)

We began publication on Independence Day with more than 100,000 paid circulation. More than half of our subscriptions were for three years.

Every one of WORLD's readers has subscribed at full rate.

(So far as we know, this is the first time that any magazine has been launched without a single introductory offer or cut-rate subscription.)

What about the magazine itself?

The central editorial idea behind WORLD is that the biggest change of our time has happened inside the human mind. People think of themselves not just as Americans or Russians or Chinese or Japanese, but as members of a human race now dependent on the same earth life-support system. They have an instinctive sense that their national governments are no longer able to perform their historic function, which is to protect their lives, their values, their property, and even their culture.

And they know, therefore, that new world institutions have to be created to perform these functions.

They know that war in an atomic age is suicidal holocaust. But they also know it is meaningless to decry the horrors of war without dealing with the basic causes of war.

Similarly, people know that no nation by itself can protect the environment.

And they have a sense that the biggest issue of all in the years just ahead is not just the squandering of physical resources but the squandering of human resources.

WORLD Magazine is concerned with such issues.

But WORLD is not solemn. A large part of the magazine is devoted to the enjoyment of living and to the life of the mind. The editors report on important books—whether they are published in New York or London or Rome or New Delhi or Buenos Aires or Manila. They also report on music, art, the motion pictures, drama, travel and photography.

Humor fits easily into the pages of WORLD. Our magazine provides

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

hospitality and a forum for the nation's leading cartoonists. Goodman Ace and Cleveland Amory have regular departments which are featured in every issue.

In the field of personal commentary, WORLD is proud to publish the regular columns of John Ciardi and Leo Rosten.

Buckminster Fuller, the architect, philosopher and futurist, writes a regular department called Geoview. U Thant, former Secretary-General of the United Nations, writes on peace and politics.

We publish editorials on the human condition.

Who are WORLD's editors? Hollis Alpert is Managing Editor. Horace Sutton is Editorial Director and also presides over the travel department. Roland Gelatt is International Editor based in London. Richard L. Tobin is Executive Editor and also writes the Communications Section. Midge Decter, formerly Executive Editor of Harper's, is our Literary Editor. Hallowell Bowser and Roger M. Williams are senior editors. Katharine Kuh provides regular coverage of the Fine Arts. Robert Craft, Stravinsky's longtime associate, writes on music. Margaret Weiss writes about photography. Most of us have worked together before with genuine affection and respect.

As I said earlier, we hope to attract a substantial number of new readers during this next year. We hope we can find new subscribers who feel WORLD is worth the asking price—$12.00 for one year, $20.00 for two years and $25.00 for three years.

We emphasize the three-year subscription because of the prodigious savings in processing and renewal costs. The savings belong to the readers.

We hope you will feel WORLD is a magazine you will read, enjoy, and respect.

N.C.

WORLD: A Review of Ideas, the Creative Arts, and the Human Condition
(Subscription Dept.)
1187 Valley Road
Stirling, New Jersey 07980

Please begin my subscription to WORLD Magazine.
☐ Three years $25 ☐ Two years $20 ☐ One year $12

Check enclosed____ Bill me later____

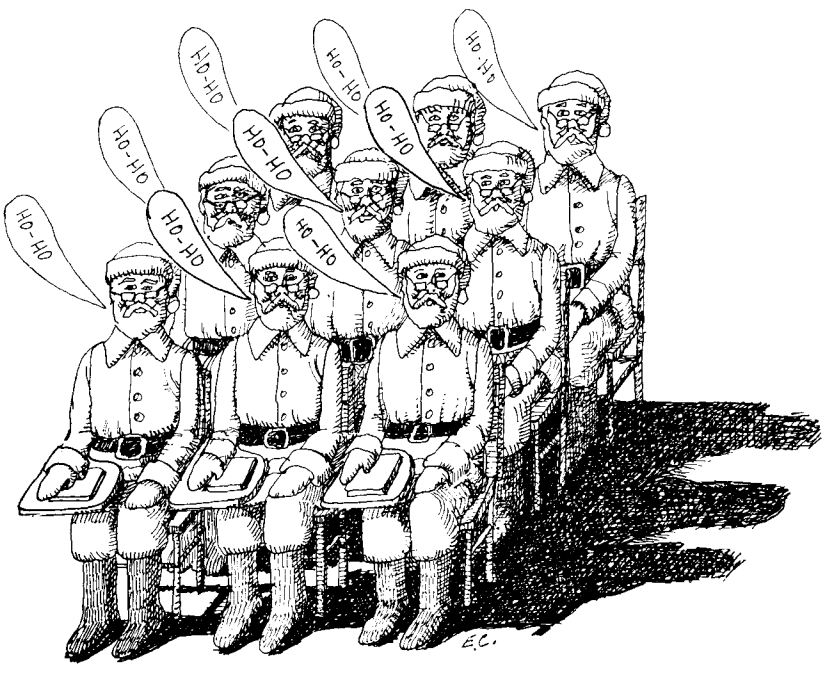
Name_____

Address_____

City_____ State_____ Zip_____

911013

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



on Dial, on Certs, on Pepsodent, on Listerine, and on Brylcreem.'

"Now the most important thing you have to learn before you go to work is the names of the reindeer . . . Dasher, Dancer, Prancer, Vixen, Comet, Cupid, Donner, and Blitzen."

One bearded student wearing a work shirt and jeans raised his hand and asked: "What about Rudolph?"

Mrs. Plowe nodded: "Yes, of course, Rudolph. And let's all remember that Rudolph has a new girlfriend this year, named Violet."

Consulting her manual once again, the instructor began teaching Santa patter guaranteed to engage even the toughest kid: "The three basic parts of our Santa talk are the invitation, recognition of the child, and questions-closing. To save time that would normally be devoted to finding out the child's name, simply invite each 'young man' or 'young woman' to sit down with you. Next, recognize how they've grown since last year: 'Young man, you've sprouted up like a weed,' or, 'You're even prettier than last year, young woman.' Then ask what they want for Christmas and close by telling them to behave, eat their vegetables, drink their milk, and brush their teeth twice daily. Adjust your speed to the number of youngsters standing in line. Under pressure, speed up your pitch so that you can get more youngsters through faster.

"Never promise anything. Always say you'll see what you can do. If they ask for a baby brother, tell them: 'That's out of my department. If you want a baby brother, you should pray for one. If God wants you to have one, then you will get one.' Never mention the word 'parents.' Use the term 'folks,' because a large percentage of kids today are not living with their original mothers and fathers. Many are in foster homes, or with grandparents or other relatives. If you say 'parents,' they might break out sobbing, 'I haven't any daddy or mommy,' and become semihysterical."

When Mrs. Plowe had finished teaching the Santa patter, her class broke for coffee and doughnuts. Much of their conversation was about the $500 to $700 that each expected to make during the Yuletide season. Although wages would be a mere $2.50 to $3 an hour, everyone was confident about regular overtime opportunities. The students seemed delighted that Western Girl was paying them $5 to attend Santa school.

Gradually the pupils clustered around four classmates with previous Santa experience. Skip Ball, a nineteen-year-old student at nearby Diablo Valley College, encouraged the new Santas to limit themselves to four-hour shifts when possible: "Going eight hours is a real strain, with all these kids tugging at your beard and asking for weird things like pet rats. Last year I worked in a Walnut Creek department store where one of the Santas freaked out. He started running through the toy department, giving things away. The guy thought he really was Santa Claus. They had to fire him."

Another Santa returnee, who works as a handyman during the off-season, warned everyone to beware of adults: "Last year I worked at Penney's, and a lot of grownups sat down on my lap and told me what they wanted for Christmas. One woman must have weighed 250 pounds."

Marvin Meyers, a husky, twenty-year-old black singer with an Oakland band, alerted the students to special problems brought on by Western Girl's steadfast compliance with federal equal-employment-opportunity regulations. "I worked at Ward's here in Oakland last Christmas and split the day with a white Santa. One little kid showed up twice in a single day and became really confused. He gave me a long look and asked: 'Santa, what's happened to your face?' I told him I'd just been out here in the California sun too long." Another student mentioned that he had heard about similar problems caused by Western Girl's occasional use of women Santas. Curious children have asked Santa why he suddenly had sprouted breasts.

James McMahan, another twenty-year-old black from Oakland, mentioned that once he had played Santa to a child who happened to glance out the store window and noticed another Santa riding on top of a parade bus: "I told the kid that was Santa and I was St. Nick. He believed me. Generally, though, I think you'll find the younger generation heavier than our own. They really know what they want: Rivieras, Eldorados, and dune buggies."

When class had resumed, Mrs. Plowe held up a pair of Santa pants and showed how a drawstring makes one size fit all. Next, she pointed out a special secret pocket: "This was invented several years ago after eleven Santas had their wallets stolen out of dressing rooms. We encourage you to use it for your valuables."

Then, with the help of Bruce Leiper, a tall, twenty-two-year-old Berkeley student, she showed everyone how to put on the pants, jacket, belt, spats, eyeshadow, wig, and beard. At this point the class was officially over, but Mrs. Plowe simply couldn't resist the temptation offered by her two black students: "You black guys look so adorable as Santas. Would one of you consider dressing up?"

Marvin Meyers and James McMahan flipped a nickel, and McMahan lost. He suited up quickly, to the cheers of his classmates. A moment later Western Girl's Oakland office cleaning lady showed up with her young daughter. McMahan promptly bounced the child onto his knee and asked, "What do you want for Christmas, young lady?"

The little girl stared out at the classroom full of future Santas but refused to utter a word. □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Letters

No Cover-up

After much dallying with our map and compass, we are still unable to find the spot on earth that would correspond to the road sign on your Science [*SR*, Nov. 25] cover. Is it real or imaginary?

Claudia F. and Vincent A. Marino
Rockville, Md.

Editors' note: Real. The distances were computed from Richmond, Virginia.

Metrickery

Frank Kendig's article "Coming of the Metric System" [SR, Nov. 25] was excellent. Unfortunately, in the comparison of the Kelvin, Celsius, and Fahrenheit scales, the article puts the freezing point of water at 233.15° K, –40° C., and –40° F. This is in error; the freezing point of water is 273.15° K, 0° C, and 32° F.

Daniel Shapiro
Warwick, N.Y.

Editors' note: It was indeed our mistake, as a large number of readers have noticed. Sorry.

Jungle Habitat: A Rebuttal

In "Cold Comfort (Animal) Farm" [SR, Nov. 25] Paul Wohl takes issue with the treatment and shelter provided for the more than 1,500 wild birds, mammals, and reptiles that reside at Warner Bros. Jungle Habitat in West Milford, New Jersey. Since animal management is my primary responsibility at Jungle Habitat and since I have several years of solid experience in the field, I would like to set the record straight on a number of inaccuracies and to rebut from a professional standpoint Mr. Wohl's philosophy regarding wildlife preservation and private-enterprise game preserves.

First, Mr. Wohl states that "originally Jungle Habitat had forty giant tortoises; on October 19 twenty-five were on view; when I looked in on them there were only eight. . . . By November 5, when Mr. David Hulmes, president of the New York Herpetological Society, visited the premises, three of these eight tortoises had died." False. We have never had more than thirty tortoises, of which only five belonged to the Habitat. The rest were being held by us on a temporary basis on behalf of International Animal Exchange, the agency that imported them. *One* of these twenty-five, which had arrived here last summer in a weakened condition, died, but only after receiving extensive and long-term medical care by the professional veterinarian on our staff.

Mr. Wohl would seem to imply that the diminishing number of tortoises on view each time he or Messrs. Saul Friess and Robert Zappalorti inspected them indicates that they were dying off rapidly. The fact is that three of the twenty-four non-Habitat-owned tortoises were picked up by another dealer in mid-September and that eighteen *more* were taken away by IAE in mid-October. This left us with eight tortoises. Three of these were picked up on October 24 by a representative of an animal farm in West Orange, New Jersey. The remaining five, which Mr. Hulmes inspected in mid-November, are healthy, well fed, and live under infrared light in a heated barn not twenty feet from the desk of our resident veterinarian.

Second, Mr. Wohl charges that our "jungle rangers . . . stir them [the animals] up with long poles." False. No instruments of any type are used to get our animals to move—simply hand motions. Anyone on our staff who abuses an animal for *any* reason is instantly fired.

Three, Mr. Wohl alleges that on a visit to the Habitat, Friess and Zappalorti saw "twenty young elephants . . . shivering from the cold." Nonsense. The maximum number of elephants we have ever had at the Habitat at any one time is twelve. The day was admittedly cold, owing to a freak change in the weather, and the elephants were outside.

Four, Mr. Wohl's article would seem to imply that Jungle Habitat provided no heated shelters for animals that need them. False. The elephants, white rhinoceroses, and ostriches living here are normally housed in a large, heated barn (75°F average temperature) during cold weather.

Five, referring to our Siberian tigers, Mr. Wohl states that "two were born in New Jersey from a tigress brought pregnant to America." The fact is that this tigress came from a zoo in the United States. (Importation of these animals is forbidden by law.) Further, Mr. Wohl states that "the rest [of the tigers] were shipped to this country from an animal dealer's stockade in Kenya." False. All of our tigers—except, of course, the two born here—came to us from various zoos and animal parks around this country.

Six, in his account of the cold-weather visit, Mr. Wohl states, "It had warmed up to about 60 on the day of my visit. I hoped that at least the normally *high-strung* [my italics] rhinoceroses would be stimulated by this change in the weather . . . . [but they] were standing around apathetically. . . ." Rubbish. The so-called white rhino is the more docile variety of rhinoceros and is normally taciturn. If threatened, these animals can be a menace; but "high-strung"? Not at all.

Having dealt with what I consider the most obvious weaknesses of Mr. Wohl's article, I would like to say that Mr. Wohl never *notified* me or any other Jungle Habitat executive of his intention of visiting our park. At no time did Mr. Wohl contact our Wildlife Department, who would have told him about the out-shipments of tortoises; at no time did he con-

Brother Timothy's
Napa Valley Notebook
4th of a series

A little background on the Estate Bottled Wines of The Christian Brothers

Under the regulations that guide the labeling of wines, an "Estate Bottled" Wine is one made from grapes surrounding the home winery.

To The Christian Brothers, home is Mont La Salle, our Monastery and Winery high in the hills overlooking the verdant Napa Valley. We came here many years ago to make and age all of our premium table wines. Though it is a lovely setting for our cellars, it was really chosen for the splendid variety of wine growing soils, and climate. The fine European varietal grapes of the *Vitis vinifera* species that we use in our wines each have very demanding requirements.

For instance, our Pinot Saint George grapes are planted in soil that is volcanic ash and gravel, underlaid with shale. While the vine struggles for survival in such a soil, it produces a crop that is small, but superb in quality. Our Pinot Saint George is a full flavored, rich and smooth red, with a bit of earthiness in its taste.

The Pineau de la Loire is another varietal that flourishes here, but in a gravelly loam which helps give this white wine grape its exceptional character.

The quantity of wine we make from these two grapes is limited. But part of the joy of wine for the cellarmaster is being able to offer something rare and unusual.

Brother Timothy F.S.C.

Brother Timothy, F.S.C., *Cellarmaster*
The Christian Brothers Winery
Napa Valley, California

Worldwide Distributors: Fromm and Sichel, Inc.
San Francisco, California

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Saturday Review Industries

President John J. Veronis
Chairman Nicolas H. Charney

Vice-President
Jon M. Stark

Director of Management Services
Herbert L. Williams

CORPORATE STAFF
Josephine Amalbert, Carol Ash, Page Cole, William Fugelsang, Ann M. MacClave

SATURDAY REVIEW PRESS

PUBLISHER
Irving Goodman

EDITORIAL DIRECTOR
Charles Sopkin

SENIOR EDITORS
Thomas Davis III, Paula Diamond, Susan Stanwood, Nancy Uberman
John Knowler, *European Editor*
Judith Sachs, Susan Smith, *Editorial Assistants*
Robert Gales, *Sales Director*
Linda Exman, *Advertising Director*
Jane Pasanen, *Publicity Director*
Judy Goldfield, *Publicity Associate*
Paula Diamond, *Subsidiary Rights Director*
David Ford, *Production Director*
Pat Douglas, *Production Assistant*
Tere Lo Prete, *Art Director*
John Carter, *Copy Chief*
Elaine Chubb, *Copy Editor*
Thomas Casserly, *Business Manager*
Bobby Artis, *Fulfillment Manager*

BOOK CLUB/DIRECT MARKETING DIVISION

PUBLISHER & GENERAL MANAGER
Neil Zelenetz

EDITOR
Steven Frimmer
Irma Pascal Heldman, *Associate Editor*
Edward Hughes, *Fulfillment Manager*
Phyllis Salzman, *Administrative Manager*

Saturday Review

PROGRAMS
William D. Patterson, *Publishing Director*
Thayer Bigelow, *General Manager*
Herbert J. Teison, *Associate Publisher*
Irving Kolodin, *Editorial Director*
Robert Jacobson, *Managing Editor*
Suzanne Oppenheimer, *Production Director*
Joseph Gasparino, *Production Manager*
Roanne Barnett, *Dailies Editor*

Programs Staff
Katina Athanasopoulos, Sandra Bersch, Dolores Koch, Dana Magee, Judith Sterling, Lee Warner

Sales Staff
Hector Cascante, Isabel Cunningham, George Ferron, Maggie Freeman, Paul Kwartin, Robert M. Marks

tact our resident veterinarian; at no time did he talk to anyone on an executive level of the Habitat.

Regarding the "philosophical" portion of Mr. Wohl's article, I take serious issue with the statement that Warner Bros. Jungle Habitat and "similar ventures . . . may well mark the beginning of the end for many of the world's rapidly declining wild animal species." Nonsense. I defy anyone to give evidence that *any* species *at any time* has ever become extinct because of zoological collecting. The Arabian Oryx, the Pere David deer, the Przewalski horse, and others would be extinct today were it not for their preservation in animal parks and/or zoos. I might add that it is generally agreed that the overall longevity of wildlife in captivity is far greater than in the wild.

Mr. Wohl states that to move a wild animal from one climate to another can constitute a fatal shock. Of course, this can happen if proper care is not exercised. All of our animals were brought here last summer and have been gradually getting used to the colder weather. Another non sequitur: With animals a large part of our company's capital assets, would it make sense for us to jeopardize their health by improper handling?

Mr. Wohl writes that "Jungle Habitat has one resident veterinarian for its 1,500 animals," and he would seem to imply that we are deficient in this respect. The facts are: 1) that we are one of the very few private parks that has a full-time resident veterinarian (many public zoos do not have a full-time vet); 2) that few zoos and animal parks have a chief veterinarian equal in caliber to ours; 3) that few zoos or animal parks have an animal clinic as professionally equipped and staffed as ours.

One final thought: There is great diversity of opinion in the wild animal/zoo/conservation field. Many contend that animals should be left in the wild. Yet the onslaught of civilization and the immense rewards for poaching offered to impoverished peoples present serious obstacles to doing so. I have come to believe that the zoos or wildlife parks of the future, supported by the public either through taxes or admission dollars, can become true Animal Survival Centers.

In conclusion, we appreciate the opportunity afforded us by *SR* to state our case. Perhaps in so doing we can regain some of the goodwill Jungle Habitat has lost as a result of Mr. Wohl's article.

Dan Brennan
Executive Vice-President
Animal Management Services
Warner Bros. Jungle Habitat
West Milford, N.J.

Editors' Note: Paul Wohl, reached in Europe, where he is on assignment for the Christian Science Monitor, *makes the following comments: While preparing the article, he repeatedly tried to speak with Mr. Brian Hunt, president of Jungle Habitat, but was rebuffed. In response to questions put to other staff members, he received vague and conflicting replies. (SR Up Front's researcher spent the better part of a week trying to verify Mr. Wohl's assertions, with similar results.) His accoun of where Jungle Habitat's Siberian tiger came from is based, he says, on a talk wit a conservationist associated with the Ne Jersey animal park. As for Jungle Habitat' denial that its rangers prod animals int action with poles, Wohl says that he per sonally saw this being done. He will con cede that his count of Jungle Habitat' animals, dead or alive, may have bee slightly inaccurate.*

Paul Wohl will reply in detail at later date.

Apropos of this discussion, we publis the following letter:

I was first made aware of inadequat housing facilities for Jungle Habitat's Al dabra tortoises after viewing photograph taken on October 19 that showed twenty six tortoises lying on a concrete floor in barn at the compound. The only hea source apparent in the photographs wa three infrared lamps, and, judging by th apathy of the tortoises, the tortoises wer certainly being kept at below-optimu temperatures. A check with the weathe bureau proved temperatures to be n higher than 44 degrees that afternoo and in the low 20s the preceding night.

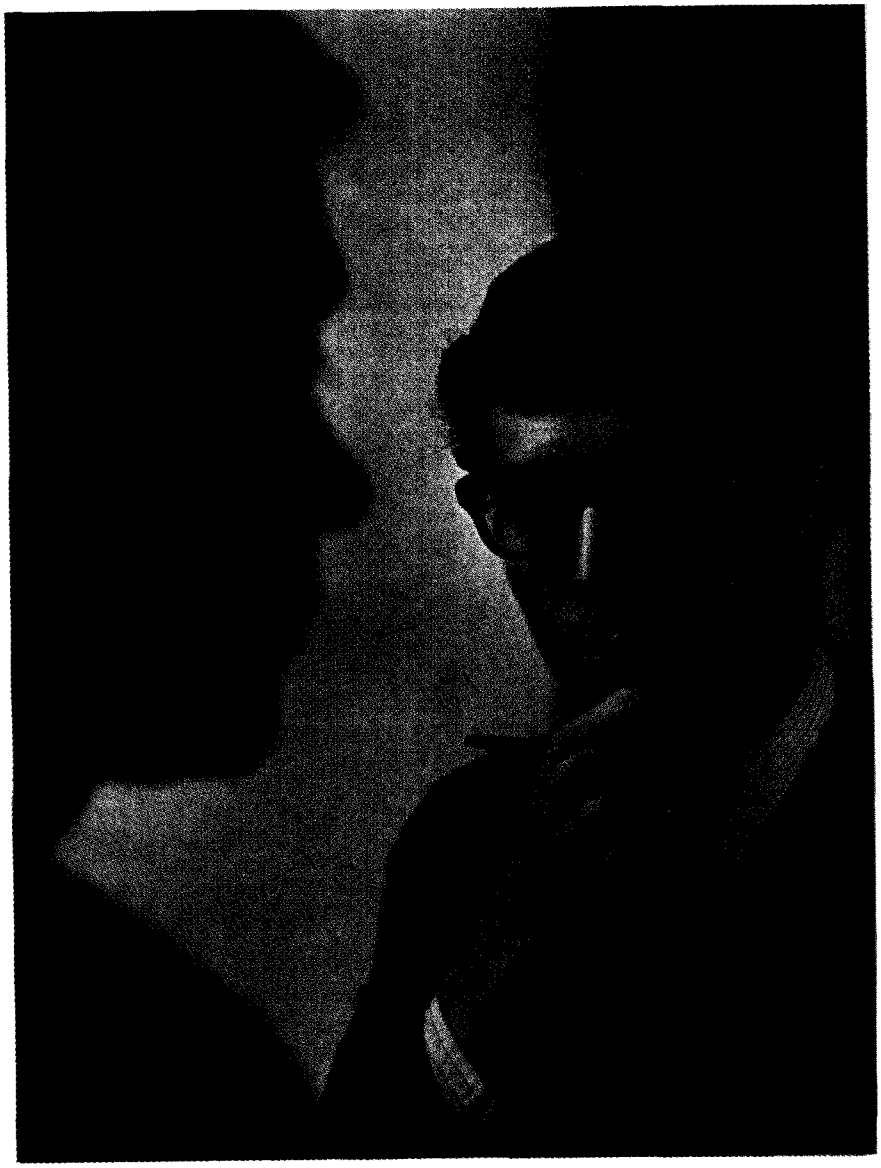
On November 5 I visited Jungle Habi tat and managed to gain entrance to th barn in which the turtles were housed At this time there were five Aldabras, al of which were very lethargic. There wer still only three 250-watt infrared lamp heating the barn, and the only supplemen tary measure taken was the addition o straw to keep the tortoises from direc contact with the cold, cement floor. Close inspection of the tortoises revealed heavil tearing eyes and a bubbling nose, one o the signs of respiratory problems in rep tiles. All of the turtles were extremel sluggish, and one appeared very weak The temperature in the barn that after noon was in the mid-50s at best, muc too low for a cold-blooded reptile fron the tropics to maintain normal body func tions. (Two days later, when I inquire about the missing twenty-one turtles an why the remaining five were still improp erly housed, I received a wide variety o answers.) Finally, late that afternoon (No vember 7) a return call from the staf veterinarian, Dr. Daniels, assured me tha the tortoises had been moved to heate quarters, and I was invited up to se their facilities. I was convinced that a effort had finally been made to give th tortoises better conditions under the car of a vet. At no time was I led to believ that any turtles had died, nor did I tel anyone that any had.

Two things remain a mystery to me: why I got many different answers regard ing what had happened to the turtles, and what took Jungle Habitat so long to do something about getting them properly housed. Something we always stress to the members of our society is, "Never get an animal of any kind unless you first have the proper place to keep it."

David Hulmes
President
New York Herpetological Society
New York, N.Y.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Is Ray French interviewing a future president of Bethlehem Steel?



Could be. Ray is one of our college relations representatives who visit campuses, interviewing and evaluating candidates for our management training program.

Perhaps a future president is among the members of our 1972 class. They are the best of some 2,000 students who were interviewed by Ray and his associates at about 100 college campuses. They include people from diverse racial and cultural backgrounds.

As in prior years since the founding of our management training program in 1922, our management recruits reported for work at our home offices early in July. During an orientation period they heard, met, and talked with members of our top management. Now they're on their initial assignments, which will begin the on-the-job training that will help to take them as far and as fast as their individual talents permit.

Our 1972 recruits make us mighty proud of today's college generation. They're alert, eager, and concerned. They're striving for constant change and improvement, and so are we. They want to help make our corporation a better one; they want to help make our society a better society.

Can you blame us for having confidence in the future of our corporation —and our nation?

BETHLEHEM STEEL

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Editorial

Apollo-The Götterdämmerung

Several weeks prior to the launch of Apollo 17, a film based on the science fiction of Kurt Vonnegut, Jr., made the rounds of the nation's educational-television stations. The film, *Between Time and Timbuctoo,* is a scathing satire, not so much of the space program or its goals, but of the paucity of humanism in the execution of the enterprise. In the film an amateur poet wins a soft-drink contest and is awarded a trip to a "time warp." After launch and after settling in for the long ride, he whiles away the hours composing a sestina. Meanwhile, back at Mission Control, fictional counterparts of Walter Cronkite and a retired astronaut banter back and forth in front of a national television audience. The space shot presumably takes place sometime in the 1980s, and in a reflective look backward the commentators try to recall the words of Neil Armstrong when he first set foot on the moon that night in July of 1969.

They can't quite get it straight. " 'A giant leap for a man, a jump for mankind'? No. How about,'A quantum step for mankind, a giant step for man'?" On they go, trying to fix precisely on those carefully programed words whose order and significance, it turned out, had dimmed beyond recall.

Vonnegut, or, at any rate, the makers of the film, had plenty of reason for focusing on Armstrong's words, not the least important of which was the article *a* that somehow got lost. As a result, his comment was widely assumed to be, "That's one small step for man, one giant leap for mankind." In fact, the correct version is, "That's one small step for *a* man, one giant leap for mankind."

What Vonnegut seemed to be trying to convey was the perception that in this overcommunicated world of ours people quickly tend to lose sight of the distinction between the operation of a technological endeavor and the significance underlying it. We become creatures of the moment, will-o'-the-wisps who somewhere along the line lose the strength of an abiding imagination and dwell instead on hardware. We fasten our attention on technological routine, on the increasing predictability of execution, on cost-benefit ratios, on the disciplined professionalism of the moon program's leading actors, the astronauts. We become jaded and absorbed with the trivial, and then we grow bored with this selfsame triviality. We can barely recall the mood that inspired this vast undertaking. Nor can we remember Armstrong's words, and if we ferret them out of a dusty almanac, we no longer know with certainty what a "giant leap for mankind" means.

What *does* it mean? Do we assess this most revolutionary of human technologies according to the motives that brought it into being? That would involve thinking about competition with the Soviet Union and about the apparent need that existed more than a decade ago to create a tangible, emotionally satisfying national goal. Do we assess the project in terms of social priorities and economic parameters—that is, dollar cost, practical spin-offs, military usefulness, scientific value? Here we find ourselves in a thicket of quantitative comparisons and judgments—some useful, some premature, most telling us little.

A balance sheet can be drawn up in each of these areas, of course. Where money is concerned, estimates of the Apollo program currently home in on a figure close to $25 billion, spent over an eight-year span. An interesting comparison, incidentally, may lie in the fact that a week before Apollo 17 was launched, Secretary of Defense Laird proposed a defense budget for the nation next year that calls for the expenditure of $80 billion.

As to spin-offs, we are told we have made enormous progress in systems engineering, computer technology, remote sensing, communications, metallurgy, propulsion systems, and management theory, among others. Given the right climate and opportunity, such advances are said to be widely applicable to the solution of domestic technical problems, as in the area of mass transportation, for example.

Militarily, the picture is confused, probably because a good deal of information undoubtedly remains classified. On the face of it, however, little strategic value beyond increased sophistication in rocketry and global surveillance seems to have been realized.

The strictly scientific harvest is equally difficult to determine at this time, principally because Apollo generated reams of data that will not be analyzed for months or even years to come. Only a few weeks ago, at a geophysical meeting in San Francisco, lunologists were still pondering the xenon content of Apollo 14 moon soil, brought to earth in February 1971. Theoretically, we are still a considerable distance from understanding fully such important questions as the origin, age, and evolution of the moon. Yet it is fair to say that—despite frequent criticisms of the limited scientific emphasis on many of the Apollo flights—the collecting of lunar rock and soil samples and the placement of Apollo Lunar Surface Experiment Packages (ALSEP) have alone stimulated vast sectors of the scientific community, particularly those elements of it engaged in lunar geology, planetary physics, and astronomy.

But, ultimately, such cost-benefit evaluations—as vital as they may be to a restive society—do not address themselves to the central question: What has been the final significance of the Apollo program?

By now Apollo has folded its wings for the last time. Future manned flights will be restricted to earth orbits, as in the Sky Lab program. The unmanned deep-space probes will continue. Apollo, therefore, signals the end—for the time being—of what must be regarded as a kind of dream, a dream wherein human captains ply their ships through the reaches of the heavens. In a way we are all vicarious captains of space ships, and with the end of Apollo it will be infinitely more difficult to imagine ourselves aboard crafts that are guided only by the circuitry of electronic crews. As machinery for exploration, the human captain has been superannuated, at least for the foreseeable future. The inescapable corollary is that we are earthbound once again, tightly contained in the atmosphere of our single spinning island by insurmountably vast distances and the laws of physics.

What, then, was this "giant leap" that Armstrong mentioned? Perhaps it was this: that the Apollo program, for all its costs and whatever the legitimacy of its birth, created a cosmic event—earth-rise played on the retinas of terrestrially evolved organisms. That still means more to me than anything else.

Alfred Meyer

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

AIR STRUCTURES: INFLATABLE ALTERNATIVES

BY JOSEPH M. VALERIO, MICHAEL DAVIES, AND ALAN STANTON

Living in a society seemingly preoccupied with the rituals of change, we find ourselves demanding changes in every aspect of our lives, including the ways in which we are sheltered. New building technologies reflect the constant appetite for modernity and raise our expectations for dramatic change; but when the dust settles, the structures raised today differ little from those erected by our grandfathers. The "international" style may be visually different from Greek Revival or Los Angeles Moderne; but the same basic services are provided, and the same constraints exist. Of the new building technologies, the air structure is one notable exception to this pattern.

Air structures, by definition, are closed containers of flexible fabric (the membrane or skin) that become rigid when inflated. The forms these inflated membranes take are balloon- or bubble-like, never rectilinear, without flat surfaces. Technically, they are a subgroup of pneumatic structures, which are, according to the German designer Frei Otto, creater of the tent systems at the recent Munich Olympics, "structural forms stabilized wholly or mainly by pressure differences of gases, liquids, foam, or material in bulk." In other words, anything that becomes more rigid when filled with something is a pneumatic structure. If that something is slightly compressed air, the pneumatic becomes an air structure.

Cousins to the soap bubble, these thin-skinned enclosures may rejuvenate our stagnant shelter technology. Whereas most conventional buildings are "overweight, overfed, and dumb," air structures are light, consume few resources, and often sport a built-in behavioral repertoire.

The sail is probably the earliest man-made pneumatic structure. More recent devices include water hoses, dirigibles, parachutes, and inflatable and upholstered furniture. Even the soap bubbles blown by a child qualify as air structures.

The growing number of air-supported buildings provides the shelter industry with a technology superbly suited for change and innovation. They can be quickly designed and erected and just as easily altered and even moved. They consume minimal resources. In contrast, the majority of homes, theaters, office buildings, and schools that are dropped on the landscape are overfed, overweight, and dumb.

They are overfed in the sense that they consume an enormous amount of time and resources during planning and construction. Because of this overfeeding, the completed building is overweight. Utilizing rigid materials that are difficult to move, assemble, and destruct, conventional building technology causes resources to be frozen—making them difficult, if not impossible, to retrieve. Much is invested in order to hold up a wall today that may not be needed or wanted tomorrow.

Of course, even more resources can be invested to actuate change in a conventional building. The wall can indeed be moved. The effect of these investments is cumulative, however; more and more constraints are placed on future change. In this way the past and the present exercise control over the future. The landscape becomes choked with monuments.

Finally, conventional buildings are dumb. Components must be lifted into place under the constant monitoring of humans. The process is lengthy, costly, and involved. Air structures, on the other hand, have a memory, tailored almost genetically into the fabric itself. Attached to a blower, they will erect themselves.

The authors are all members of Chrysalis, a design firm that is working with future forecasting techniques, information exchange, and community video, as well as with air structures. Joseph M. Valerio is also with the School of Architecture at the University of Wisconsin in Milwaukee. Michael Davies and Alan Stanton are chief designers for the Centre Beaubourg arts complex in Paris.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

There are three basic types of air structures—single-skin, double-skin, and dual-skin. The single-skin air structure, the most common variety, provides usable, unobstructed space of unlimited dimensions. It is supported by an internal pressure just slightly above the external pressure (approximately .03 psi above atmospheric pressure). The skin is usually a nylon or polyester fabric coated with PVC (Polyvinyl Chloride). Such skins at present have a relatively short life span—three to ten years—but this is improving. New teflon-coated fiberglass fabrics, for example, can be considered permanent.

Double-skin structures utilize two membranes, one within the other, to cover the desired area. The air space between the two membranes is used for insulation and security. If the outer skin punctures, the inner skin will plug the hole. Both single- and double-skin structures require the use of air locks, and the blowers must be operated constantly.

Dual-skin air structures also use two membranes, but in this case the membranes are connected by webs or ties. Only the space between the membranes is pressurized. Usually the structure consists of a series of inflated tubes forming a barrel vault over the usable area. These tubes must resist the same loads as a single- or double-skin structure, but with a smaller cross-sectional area. To compensate, the pressure within the cells must be increased. However, the inflated area of a dual-skin structure can be sealed, thus eliminating the need for blowers. In all three types of air structures the inflated cavity approximates a sphere or a spherical segment.

One of the most important advantages of air structures is that large areas can be enclosed without internal supports. For example, the huge inflatable greenhouse constructed by Goodyear near Wooster, Ohio, in 1968 covers a full acre and has opened up new possibilities for indoor farming. Free of the maze of pipes, beams, and trusses found in traditional greenhouses, this air structure has allowed the use of heavy farm machinery in an enclosed, seasonless environment.

Dividing interior space in an air structure, however, can be difficult, especially with single- and double-skin structures. Rigid, rectilinear panels of such materials as wood or aluminum are not compatible with the soft, spherical surfaces of the air structure. On the other hand, flexible membranes can efficiently subdivide the structure into usable cells. By varying the pressure between the cells, the internal membranes can be kept taut. To provide sound insulation, dual-skin membranes can be filled with partially expanded styrene pellets as dividers. Multilevel air structures with soft floors also have been constructed. The Conference Pavilion at Sonsbeek in the Netherlands, for example, used two inflated cells, one above the other. The upper-level auditorium could sustain thirty people on its soft floor. As a toy, Chrysalis has designed a double-skin structure in which people can move about between the inner and outer membrane.

Under high internal pressures air structures can resist considerable loads. Jens Pohl of the University of Sidney has studied the design of air-inflated columns and has concluded that the strength of an inflated column is largely dependent on its internal pressure. Thus, columns comparable in strength to steel can be produced, with marked savings in material and ease of construction. Multilevel air structures that act as pneumatic columns capable of supporting rigid floors also have been studied.

Another application of air structures involves their use as formwork for heavy materials. In the most extreme case a single-skin air structure has served as a form for concrete. A version of this system was used recently in Israel to produce small, dome-shaped houses. Single-skin membranes can also be covered with foamed urethane and other plastics. In cold regions air structures have been employed to form ice tunnels. A single-skin structure is inflated and then simply sprayed with water. When the water freezes, an ice tunnel results.

Still another single-skin air structure has been employed as a form for a geodesic dome. The dome is constructed from the top down, starting on a deflated, hemispherical air structure. The air structure is gradually inflated, and sections of the geodesic dome are then added around the perimeter, allowing workmen to operate at ground level.

Most air structures, however, are designed only to resist wind loads. These loads are critical in determining both the internal pressure needed to support the air structure and the strength required of the fabric.

The wind load is dependent upon the shape of the structure and is not constant over the entire surface. In the case of a hemispherical, single-skin dome, it is known from wind-tunnel tests that the wind load varies from a maximum positive pressure (a "push") at the base of the windward side to a maximum negative pressure (a "pull," or lift) near the top of the structure on the same side.

Only a small portion of the windward base of the structure is actually under positive pressure, or "pushed in" by the wind. Here the positive wind pressure must be balanced by the internal, or inflation, pressure. At this point of

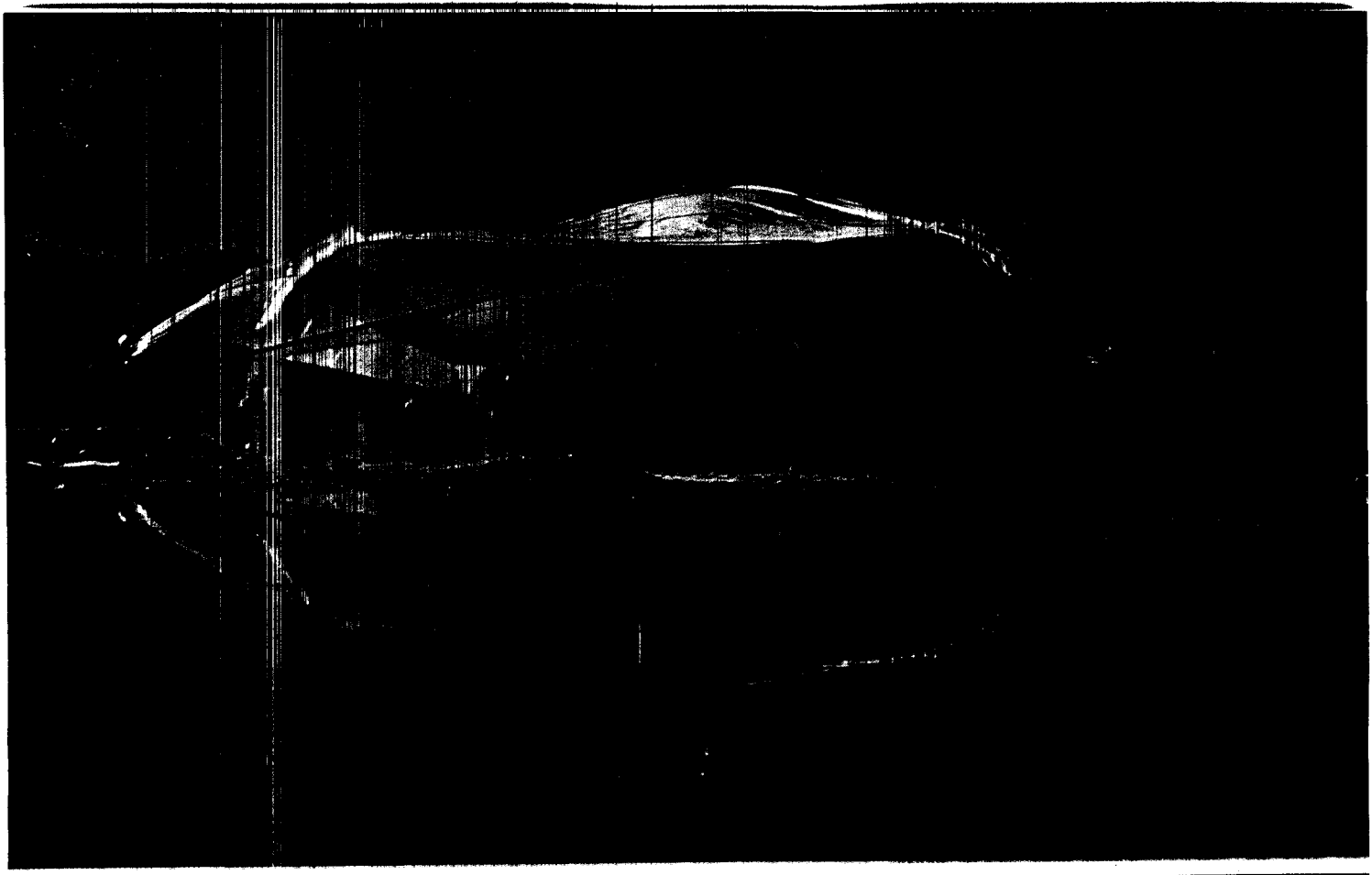
The air structure at right was constructed in Death Valley, California, by a group of nomadic environmental designers known as Ant Farm. Unfortunately, this particular structure tended to blow away under high winds.

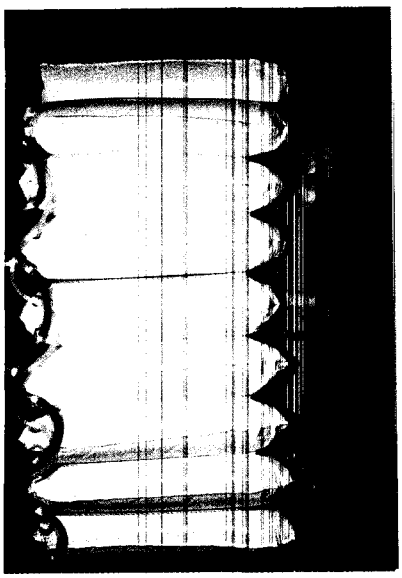
The child's playpen at lower right was designed by Chrysalis. It confines the child in a totally "soft" environment and would be particularly useful for children afflicted with hemophilia.

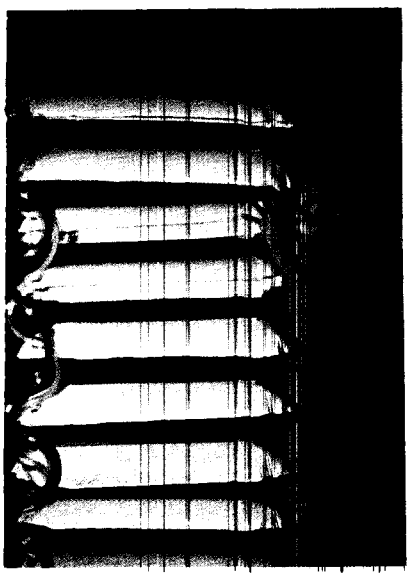
Light mats—membranes that can control the amount of light emitted through them—are displayed at lower left. Designed by Chrysalis, these membranes are divided into two series of chambers. When one series is inflated, the light mat is opaque (top). When the other group of chambers is inflated (bottom), the membrane will transmit 50 per cent of the light that strikes it. Such light mats could be used to control the internal temperature of an air structure.

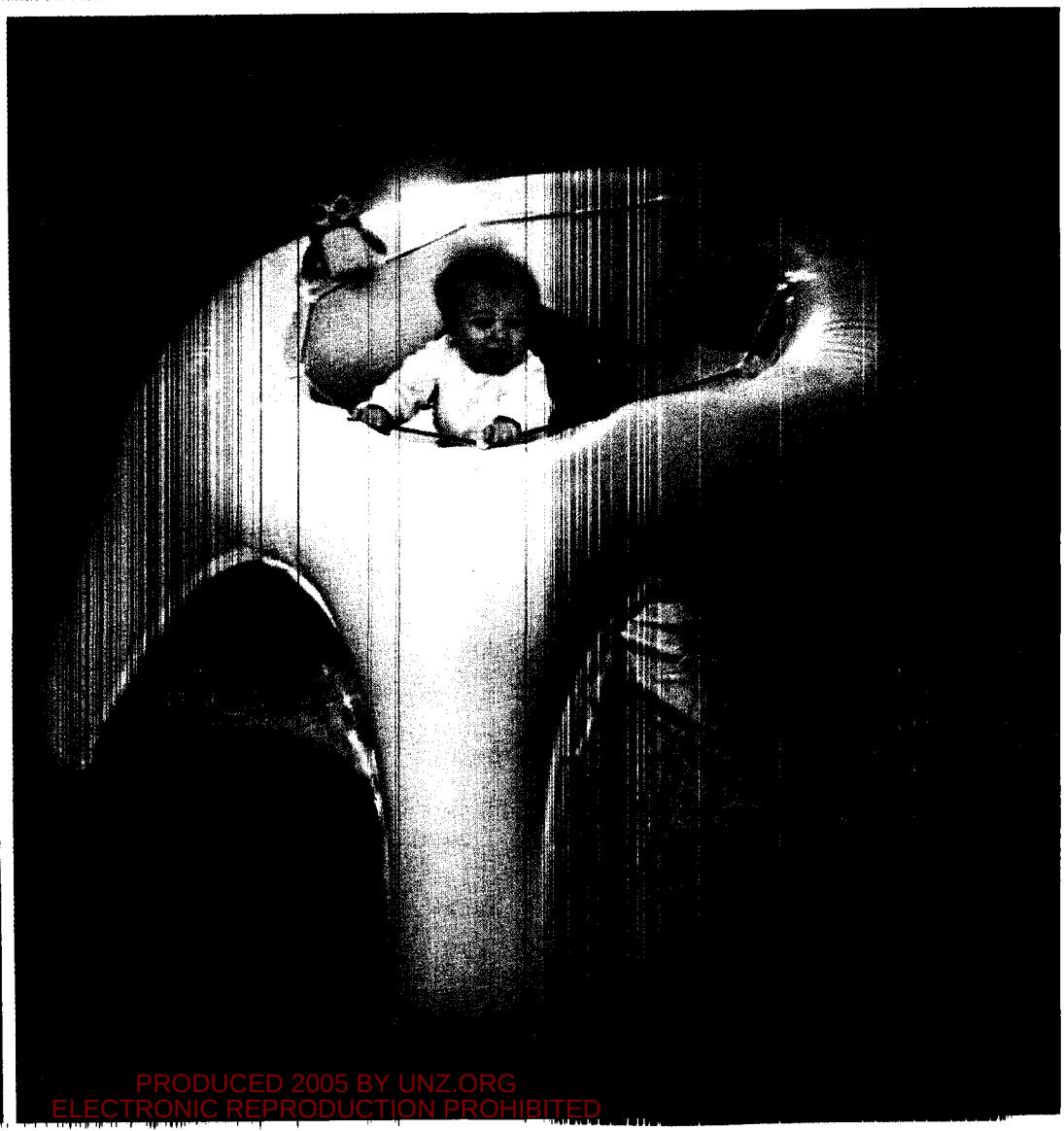
Overleaf
The Pneudome, designed by Chrysalis, is a mobile air structure that employs a water ballast for anchoring. This anchoring system is basically a tube, filled with 400 gallons of water, that is attached to the perimeter of the dome. The Pneudome is 25 feet in diameter, and a model utilizing a polyester fabric coated with PVC (Polyvinyl Chloride) can be purchased for under $2,000. Because of the low cost and mobility of such air structures, they may someday be used for emergency housing following floods or other natural disasters.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

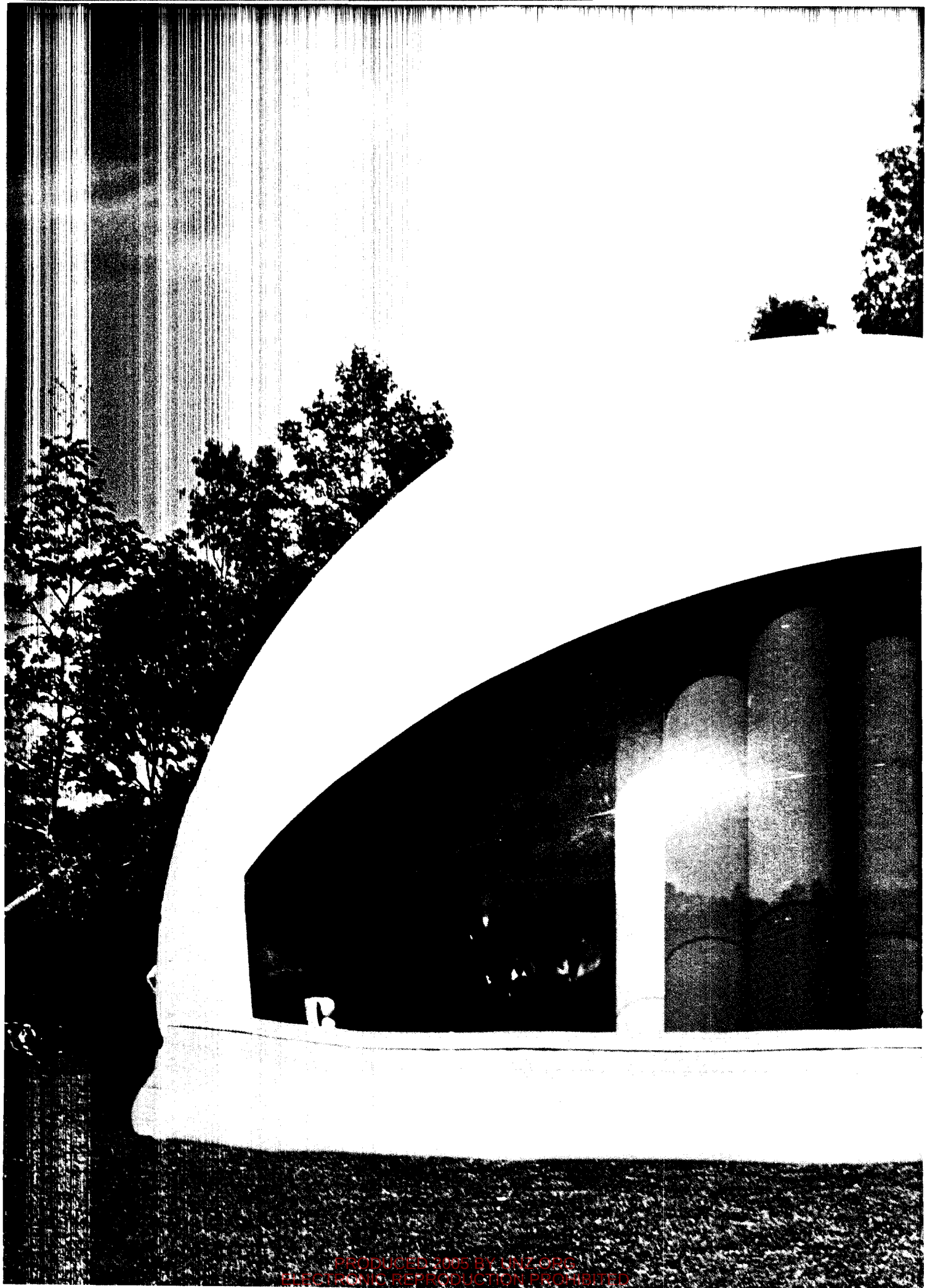




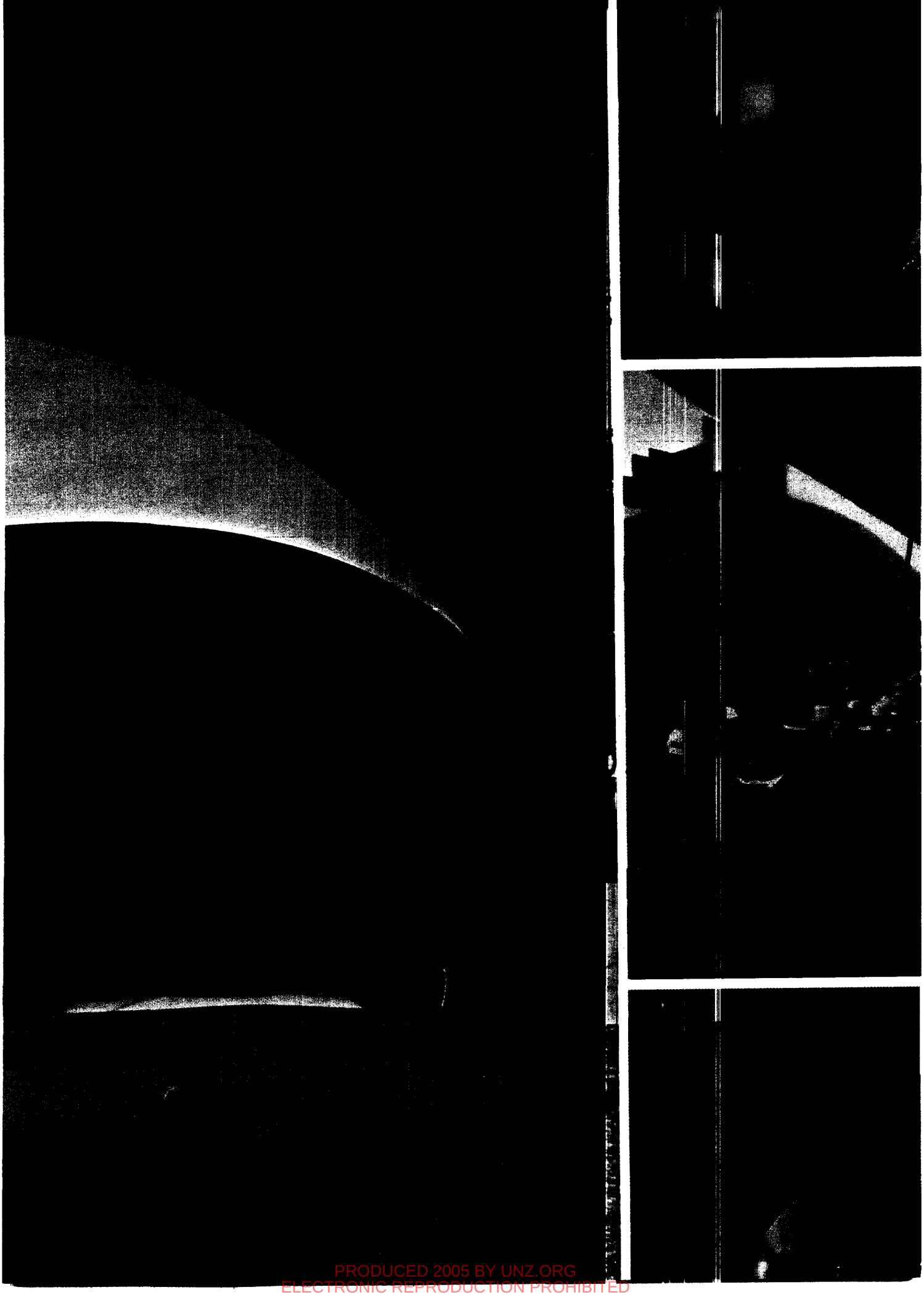




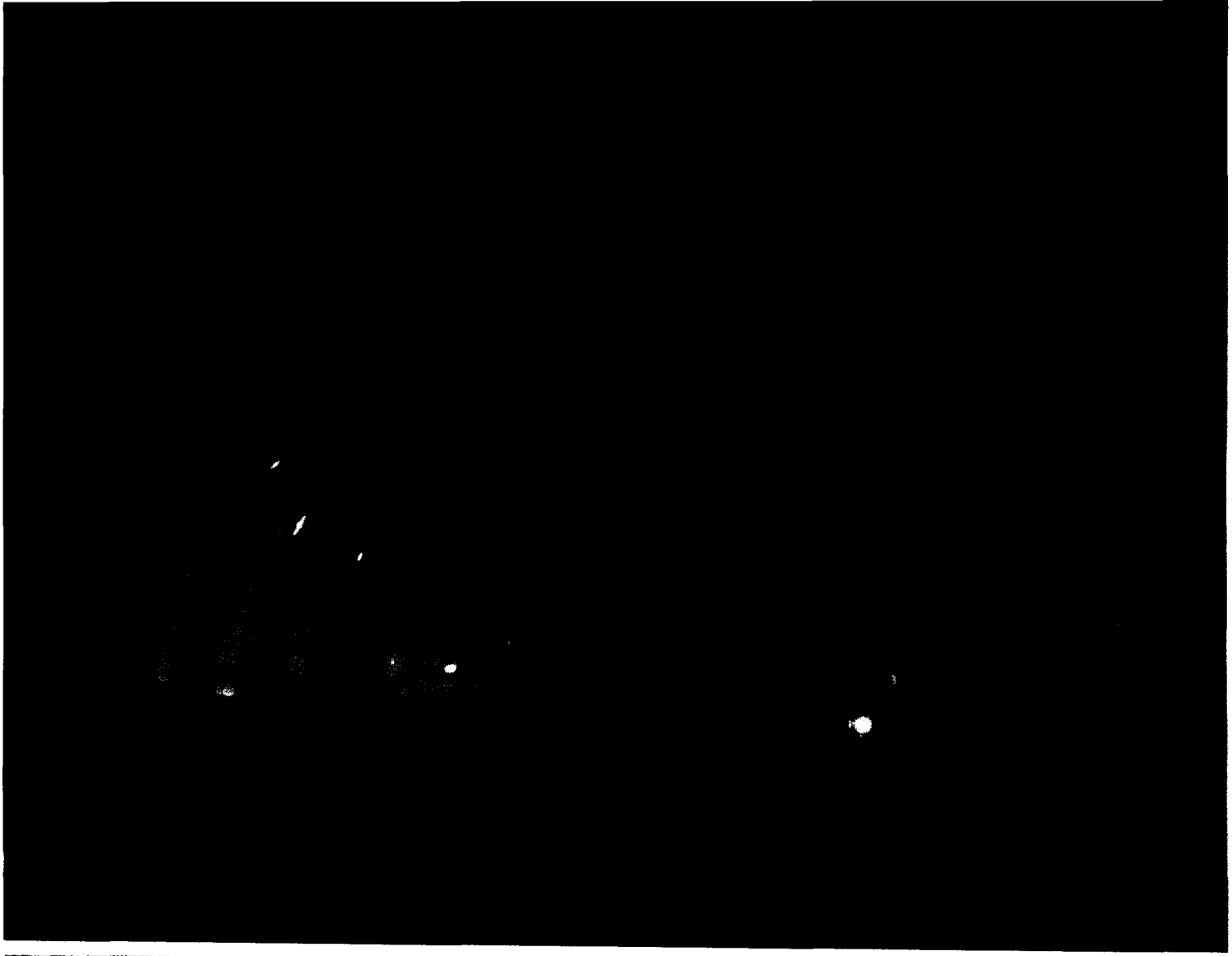
PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

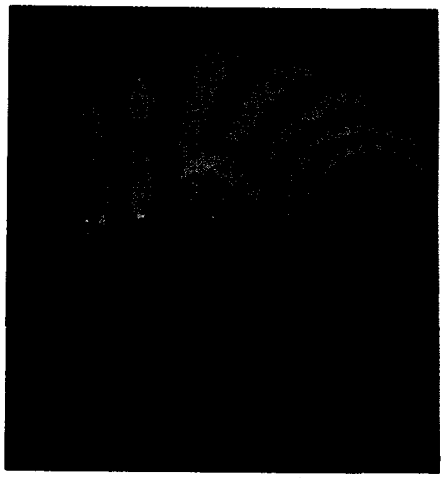


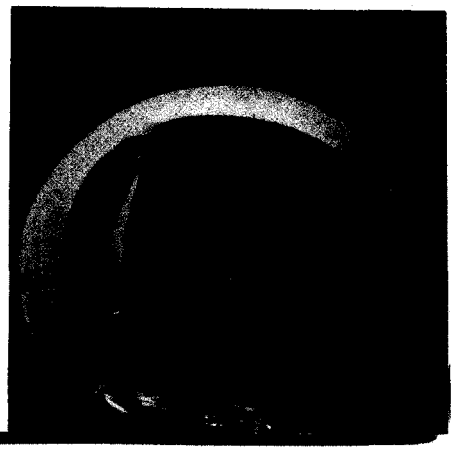
PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

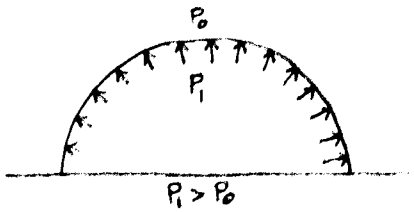




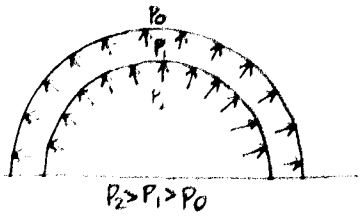


PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

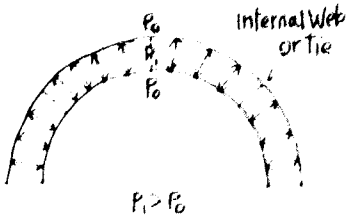
The dome at left is a prototype for a large inflatable planned to enclose a one-acre campus of Antioch College in Columbia, Maryland. Designed by architects Rurik Ekstrom and Charles Tilford and students from Antioch and the University of Maryland, the final structure will house facilities for 300 students. The air structure displayed in the photographs at lower left is called *Instant City*. It was constructed in Abiza, Spain, in three weeks by Spanish architecture students to house participants in the International Conference of Societies of Industrial Design.



Single-Skin Structure



Double-Skin Structure



Dual-Skin Structure

The drawings above illustrate the three basic types of air structures. In the most common type, the single-skin structure, the internal pressure (P_i) is greater than the external, or atmospheric, pressure (P_o). It is this pressure difference that keeps the dome inflated.

In double-skin structures the internal pressure (P_2) is greater than the pressure between the two skins (P_1), which, in turn, is greater than the external pressure (P_o). Both single- and double-skin air structures require the constant use of blowers to keep them inflated.

Dual-skin structures, however, do not require blowers once the structure has been inflated. Here the internal and external pressures are the same. Only the area between the skins is pressurized.

equilibrium the stress in the fabric is at a minimum.

Most of the surface of a hemispherical air structure is, then, under negative pressure. The wind passing over the curved surface of the air structure causes it to act like a wing; thus, inflatables often tend to "take off" and must be anchored to the ground. There are other effects as well. The negative pressure caused by the wind tends to keep the air structure inflated. Also, the skin is under maximum stress near the top—where internal pressure is added to the maximum "suction" due to the wind—instead of at the bottom as in conventional structures. To relieve these stresses, a net of steel cables often is spread over the skin.

Wind loads also are determined by what is called the profile of the structure—the ratio of height to span. Basically, as the ratio of height to span increases, the wind loads increase, as do the stresses on the skin. David Geiger, structural engineer for the U.S. Pavilion at Expo '70 in Japan—the largest and most advanced single-skin air structure yet built—has determined that the optimum height-to-span ratio is about 20 per cent. The Expo '70 Pavilion, utilizing this ratio, was designed to withstand winds of up to 180 miles per hour.

A number of people are now exploring the possibility of designing air structures that automatically respond to loads caused by external wind conditions. For example, Chrysalis is collaborating with Thomas Vonier and the Windworks group of Wisconsin on the development of a feedback system that will enable pressures within air structures to change in direct proportion to changing wind loads. The plan is to link one of Windworks' electricity-generating windmills to the blower machinery of an air structure. Since both the windmill's rate of electrical output and the loads exerted on the air structure are functions of wind velocity, any increase in wind load, for example, should automatically trigger an increase in electrical output and thereby increase the internal pressure of the air structure. The result would be a consistently stable structure that is automatically controlled.

How much does an air structure cost? First of all, investment in air structures should be viewed as a trade-off between initial costs (which can be rapidly recovered) and operating costs. The initial costs for a large single-skin (4,000 square feet or greater) vary from $4 to $6 per square foot, including anchoring systems and blowers. The skin itself will vary in cost from $2 to $4 per square foot. Double-skin structures will add approximately $1 per square foot to the cost of the skin. Operating costs include the price of the power to run the blowers (in single- and double-skin structures) and replacement of skins. Maintenance costs will be comparable in most cases to those of conventional systems.

All of which makes for a remarkably economical means of shelter. However, there are cost-related problems, especially in the area of temperature control.

Temperature control in air structures is quite different from that in conventional structures, because of the low thermal mass of the skin. Cooling is not a problem, because the low thermal mass reduces the amount of heat that can be trapped by the air structure. This can be further reduced by utilizing a fabric with high reflectivity and low translucency—an opaque, white fabric.

In contrast, the low thermal mass of the skin allows large amounts of heat to escape into the atmosphere and thus causes heating problems. These can be somewhat alleviated by using double- or dual-skin structures, which add to the cost of the skin but which also provide air space for insulation. Compound fabrics are currently being studied that contain insulation material and that could aid in containing heat in single-skin structures. Also, by using the blower of the heating system to support the air structure, costs can be further reduced.

Another set of problems peculiar to air structures involves system failures. Blower failures or loss of air pressure from rips or slashes in the fabric can cause the structure to collapse. The air loss is a function of the difference in internal and external pressures and the size of the opening. In a structure enclosing a large volume of air under low pressure, the flow of air through the hole can be compensated for by increasing the input of air to the structure. If this compensation is not possible, it will still take a long period of time (dependent on the size of the hole) for the structure to deflate—in some cases many hours.

Furthermore, unwoven fabrics are now available that resist slashing. The fibers bend instead of breaking, forming a bar of fibers that resist the force of the knife blade or other penetrating object. If the fabric is successfully slashed, the tensile stress in the skin will tend to pull the cut closed again. Also, devices can be placed in the structure that will sense air loss and notify a controller that the inflatable has been damaged.

There is a limit to the distance a conventional building can span. As the span increases, the weight of the building material increases until it exceeds its own strength. At this point the structure fails. However, as we have stated, the distance a single- or double-skin

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

structure can span is virtually unlimited, because the column of air under the fabric supports the structure's "dead weight." The people inside the structure are walking through the material that holds the fabric up.

As a result, air structures have been designed that cover as much as fifty acres. In such large structures the membrane rides high above the heads of the human occupants. No services are provided other than shelter. Such structures are static and because of their low cost offer the most immediate application of air-structure technology. However, the real potential is for dynamic air structures that offer extensive services without additional restraints. Dynamic air structures, unlike conventional buildings, can redefine their role in the environment on command. They do this in three ways—by changes in location, by changes in form, and by changes in membrane characteristics.

It is a popular notion that buildings don't move around. In fact, the site of a conventional structure is a vital element in its planning and design. It is a built-in constraint. Air structures, however, can be mobile.

The key to this mobility is the light weight and "memory" of the fabric. The shape of an air structure in transit is independent of its shape after deployment; thus, the structure can be fabricated at a factory in a remote location. Work completed off the site does not make the system more difficult to transport, whereas in conventional building technology the more complete the structure when it leaves the factory, the more difficult it is to transport.

In professionally constructed air structures the sections of fabric are usually joined by electric welders, the most common and dependable of which are radio-frequency (rf) welders. These rapidly heat the fabric throughout and then quickly cool it, a process that produces especially strong welds. Other joining methods include taping, gluing, stapling, and sewing. Taping is the simplest but tends to fail when the joined fabric is exposed to the sun. Gluing and stapling are relatively slow processes. Nevertheless, air structures, especially single-skin designs, lend themselves to complete fabrication by the nonprofessional more than any other building type.

The mobility of an air structure is partially determined by the kind of anchoring system it employs. There are two types of anchors—permanent and temporary.

Permanent anchors include foundation walls, earth berms, "dead weight" anchors (usually a mass of concrete), and a variety of "tent stakes." These require on-site labor similar to that required for foundations in conventional construction. The use of permanent anchors will leave a "footprint" wherever the structure has been.

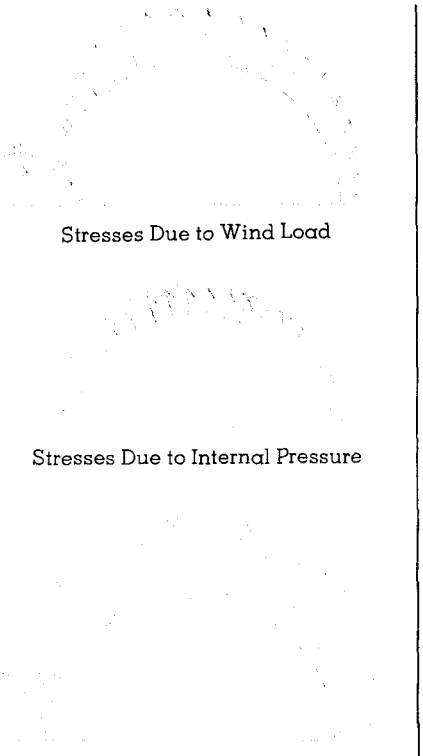
Temporary anchors leave no mark. The most common type is the water ballast, usually a water-filled tube running around the perimeter of the air structure. For the Pneudome, a Chrysalis-designed air structure that is twenty-five feet in diameter, 400 gallons of water are required for the anchor. The Cosmos dome, seventy feet in diameter, requires 4,000 gallons of water to hold it in place.

Over long periods of time under heavy winds, air structures anchored with water tend to creep across the ground. This has led to the development of alternative forms of temporary anchoring. One viable form employs negative pressure, a kind of "suction cup" effect. A negative-pressure anchoring system now being studied utilizes a dual-walled vacuum mat that forms sealed cavities. These cavities grasp the ground by suction, holding the structure down. Both negative-pressure and water-ballast systems become difficult to employ when the floor area covered exceeds 5,000 square feet, but they are a step closer to functional anchoring techniques that do not require on-site construction.

The mobility of an air structure also is determined by the unpacking and repacking that accompanies the movement of the inflatable. However, by dividing the structure into cells and by using staged inflation and deflation, an air structure can be taught to deploy and repack itself. Using such a system, Mark Fisher and David Harrison of Air Structures Design have developed a structure that will erect and dismantle itself and that has an eighty-to-one expansion ratio.

Still in the experimental stage are air structures that move themselves. These systems crawl over the ground, or "swim." For example, the "annelids," developed by Simon Conolly, Mark Fisher, and Walter Neumark, wallow over the ground like electric worms reaching a maximum speed of five kilometers per hour. The system divides a linear structure into cells that can be evacuated and inflated sequentially, setting up a wave motion. Cells are lifted and then set down forward of their original position. A minimal increase in energy is required—over a static air structure of the same volume—to keep an annelid moving.

Annelids were first designed to act as hangars for damaged aircraft: the structure would crawl over the plane. Others are now being designed for use in transporting sections of oil pipelines. Here the sections of pipe will be rolled onto a deflated annelid. The annelid will then be inflated and should crawl away with the pipe section on its back. Such systems are not yet prac-



The stresses on the skin of an air structure due to wind and internal pressure are illustrated in the drawings above. The wind produces positive pressure, or "pushes" the structure (top), only at a small area on the windward side of the dome. Over the rest of the structure the wind causes a "lift," or negative pressure. The internal pressure, on the other hand, stresses the skin (middle) equally along its surface. The combination of the stresses due to wind and internal pressure (bottom) results in a "lift," or negative pressure, over the entire surface of the dome, the greatest lift occurring near the top of the structure.

Designed by the Japanese architect Yutaka Murata, the Fuji Pavilion at Expo '70 in Osaka, Japan, was large enough to cover a ten-story building. Able to resist winds of more than 130 m.p.h., this air structure was constructed of a series of tubes, or air beams. Each tube was 263 feet long and 13 feet in diameter.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

tical, but they may someday provide a means by which rigid structures can be moved into place after erection.

The capability of an air structure to move completely alters popular notions about shelter. Buildings and other facilities can be rented when needed and delivered to the site ready to inflate. Churches can be inflated on Sundays. Kids can be told to finish their dinner before blowing up the playroom. Whole structures or parts of structures can be easily returned to the manufacturer for alterations or modifications.

Moreover, given movement capability, the planning of physical facilities can become experimental. Structures can be erected (inflated) and their performance monitored. The actual siting of a structure can then be a response to feedback from the experimental situation. Buildings can find their optimum location. Also, the question of what to do with a structure after it has ceased to function can be answered. Decisions concerning the future of old structures have always been absolute: the facility must either be destroyed or preserved. The loss of resources is enormous in either case. A structure never loses all of its value, and the reconditioning process is often as expensive as new construction. Dynamic air structures offer a third alternative—they can be deflated and moved away.

Besides moving from place to place, air structures can also undergo internal or form changes. In single-skin structures, for example, form changes can be triggered by building muscles—collars, jacks, and other devices—into the fabric. The surface area of the membrane is thereby changed, altering the three-dimensional form of the structure. Large areas can be subdivided as needed.

One full-sized air structure capable of extensive form changes has been constructed by Simon Conolly and Mark Fisher of Air Structures Design. Called Dynamat, it consists of a three-dimensional grid of air-tight cells. Each cell is connected to its neighbors by electrically operated valves that are wired to a "central nervous system." Cells can be selectively inflated and deflated. The whole structure can expand, contract, and warp in one or two directions. Arteries of linked cells can be developed to deliver air to a remote location in the grid, producing local deformations. The designers of Dynamat have suggested that a control unit, utilizing magnetic tape, also could be added to the present system. The tape cartridge would then act as the "architect" of the system.

In systems like Dynamat the structure remains basically rigid while the form changes are occurring. Structural integrity is preserved. Furthermore, actuating the change requires minimal energy; the energy is simply redistributed in the system to stimulate change. Because of the modular nature of these structures, sections can be added and made integral parts of the structure simply by changing the signals transmitted through the nervous system to account for the added "limbs."

Experimental systems have been developed that apply the form-change capabilities of air structures to transportation. In one system a collar is placed around an inflatable tube. The collar has a smaller diameter than the tube, and thus a volume of air can be forced into the tube, causing the collar to move. Walter Neumark at Cardington Military Research Establishment in England has developed a vertical tube of this type that can lift a man. If such a system becomes practical, it could represent the first tracked movement system that is less expensive than steel rails. Furthermore, since the system is light in weight, it could be mobile; the tube could be moved to change the path and direction of the transportation system.

Climbing the wall.

A third type of change in air structures can be accomplished by changing the characteristics of the membrane, or skin. Obviously, the rigidity of any membrane can be changed by increasing or decreasing the internal pressure. More pressure and the skin becomes taut; less pressure and it becomes soft again.

Designers at Chrysalis are now working on a system of "light mats"—membranes that can adjust the amount of light that passes through them. In one experimental design an opaque skin and a clear skin are connected to form the outer walls of a tube. The opaque skin of one tube is then welded to the clear skin of the next, forming a surface of tubes. Each tube is divided into two chambers by an opaque membrane. If the chambers between the opaque skins and the opaque membranes are inflated, the surface will be completely opaque—it will transmit no light. However, if the chambers between the clear skins and the opaque skins are inflated, the surface will be only 50 per cent opaque—half the light that strikes it will pass through.

Work is now underway at Chrysalis to combine light mats with other dynamic systems in order to construct the "Energy House," a completely self-sustaining environment. In the Energy House the membrane will serve as structure, enclosure, and anchorage. It will also control light and thermal transmission and collect solar energy.

Thus, a shelter technology now exists that can keep pace with the demands of our mobile, change-oriented society. If it is to take hold, however, several obstacles must be overcome. One is the shelter industry itself, with its traditional methods of fabrication, transportation, erection, and replacement. Another, perhaps more formidable, obstacle is the society this technology might serve.

In the past the implementation of a new building technology required a period of transition in which the new system was forced to take old forms. Metals and plastics, for example, first appeared as fake wood. Air structures, however, are not like other building systems. It is difficult, if not impossible, for them to imitate old patterns.

For large public buildings air structures have been well received, primarily because of their low cost. In most of these structures the skin is suspended high above rigid floors, furniture, and partitions. The artifacts people confront are the same as in those of conventional buildings. The air structure itself is remote. In terms of small, private housing only limited examples of air structures exist. In these cases, however, air structures have been able to respond to the demands placed on them by their human occupants.

If air structures do take hold, they could form the basis of the first popular shelter technology since wood that can be adapted for use by the nonexpert. Although the materials are technically sophisticated, the fabrication procedures are uncomplicated. Only reliable adhesive tape or inexpensive electric welders still need to be developed.

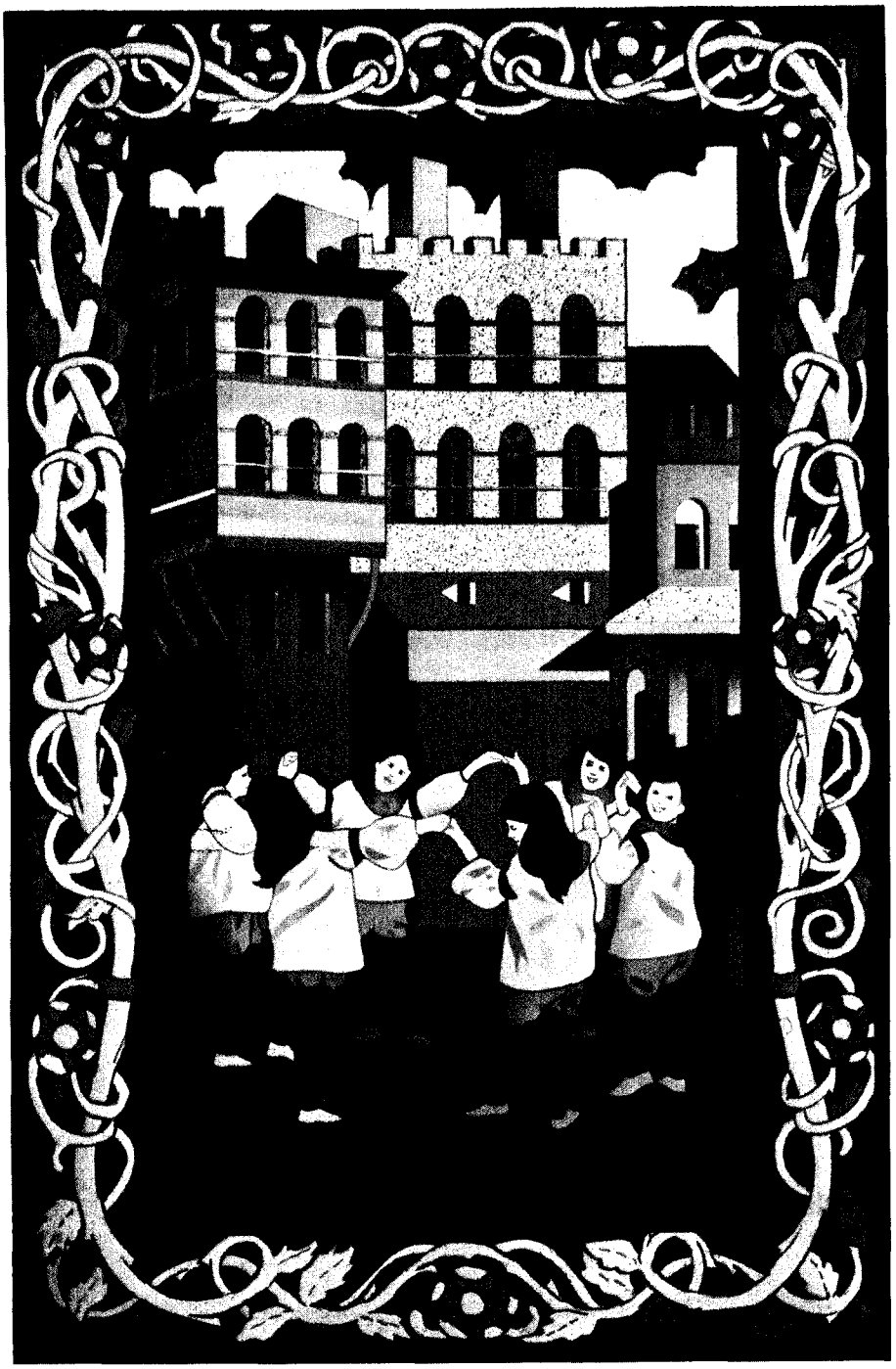
The equivalent of oversized dress patterns are used to cut the fabric. These patterns, along with blowers, anchorage systems, and uncut fabric, could be sold in packages or kits. Once this point is reached, it is not difficult to imagine the whole family sitting around the dining room table, designing and fabricating an extension for the house or a complete new structure. □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Part of the child's adventure into life is the discovery of death.

The Kingdom Where Nobody Dies

BY ROBERT KASTENBAUM
ILLUSTRATIONS BY BUNNY CARTER



Ring-around-the-rosy began in medieval Europe to mock the peril of Black Death.

Children are playing and shouting in the early morning sunshine near the end of Alban Berg's opera *Wozzeck*. They are chanting one variant of a very familiar rhyme: "Ring-a-ring-a-roses, all fall down! Ring-a-ring-a-roses, all . . . ." The game is interrupted by the excited entry of other children, one of whom shouts to Marie's child, "Hey, your mother is dead!" But Marie's child responds only by continuing to ride his hobbyhorse, "Hop, hop! Hop, hop! Hop, hop!" The other children exchange a few words about what is "out there, on the path by the pool," and race off to see for themselves. The newly orphaned child hesitates for an instant and then rides off in the direction of his playmates. End of opera.

What begins for Marie's child? Without knowing the details of his fate, we can sense the confusion, vulnerability, and terror that mark this child's entry into the realm of grief and calamity. Adult protection has failed. The reality of death has shattered the make-believe of childhood.

Children are exposed to death on occasions much less dramatic than the sudden demise of a parent. A funeral procession passes by. A pet dies. An innocent question is raised at the dinner table: "Was this meat once a real live cow?" In a society such as ours that has labored so diligently to put mortality out of sight and out of mind, most of the questions children ask about death make parents uncomfortable. It is often thought that there is no appropriate answer that would not be alarming or threatening to children. Therefore, the subject of death is mostly evaded entirely or fantasized.

The intrusion of death places typical parents in an awkward position. They are not able to relax and observe—much less *appreciate*—how the child

Dr. Robert Kastenbaum is professor and chairman of the psychology department at the University of Massachusetts in Boston. He is coauthor of The Psychology of Death, *published this fall by Springer.*

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

orients himself toward death. Yet much can be learned by indulging this curiosity. By dropping the adult guard that directs us to protect children from morbid thoughts and threatening events and by concentrating instead upon how children themselves react to death, surprising insights begin to emerge. We find from psychological research, clinical experience, folkways, and incidents shared with children in and around home that, despite the lack of explicit references, death is an integral part of growing up.

A child's fascination with death occurs almost any time, almost any place. Mortality is a theme that wends its way into many of the child's activities, whether solitary or social. Consider games for example. Ring-around-the rosy is a popular childhood play theme in both this country and Europe. Our own parents and grandparents delighted in "all fall down," as did their ancestors all the way back to the fifteenth century. The origin of this game, however, was anything but delightful.

Medieval society was almost totally helpless against bubonic plague—Black Death. If adults could not ward off death, what could children do? They could join hands, forming a circle of life. They could chant ritualistically and move along in a reassuring rhythm of unity. Simultaneously acknowledging and mocking the peril that endangered each of them individually, the children predicted and participated in their own sudden demise: "all fall down!" This was a playing-at-death, but it utilized highly realistic materials. Ring-around-the-rosy had one distinct advantage over its model—one could arise to play again. While the game provided the vehicle to conquer or survive death, it was also a way of saying, "I know that I, too, am vulnerable, but I will enjoy the security of other young, living bodies around me." An exercise in make-believe? Perhaps. Nevertheless, this familiar game also deserves respect as an artful response to harsh and overwhelming reality.

Death has been ritualized in many other children's games as well. In the playful romping of tag, what is the hidden agenda or mystery that makes the chaser "It"? Could "It" be the disguise for death? We may be reluctant even to speculate that the touch of death is at the symbolic root of the tag games that have flourished for so many centuries throughout so much of the world. Yet Death (or the Dead Man) certainly is central to at least some of the chase games beloved to children. In the English game "Dead Man Arise" the central player lies prostrate on the ground while other children either mourn over him or seek to bring him back to life. When least expected, up jumps John Brown, the Dead Man, the Water Sprite, Death himself, or whatever name local custom prefers. The children flee or freeze in surprise as the chaser whirls toward them for a tag that will bestow Dead Man status upon the victim.

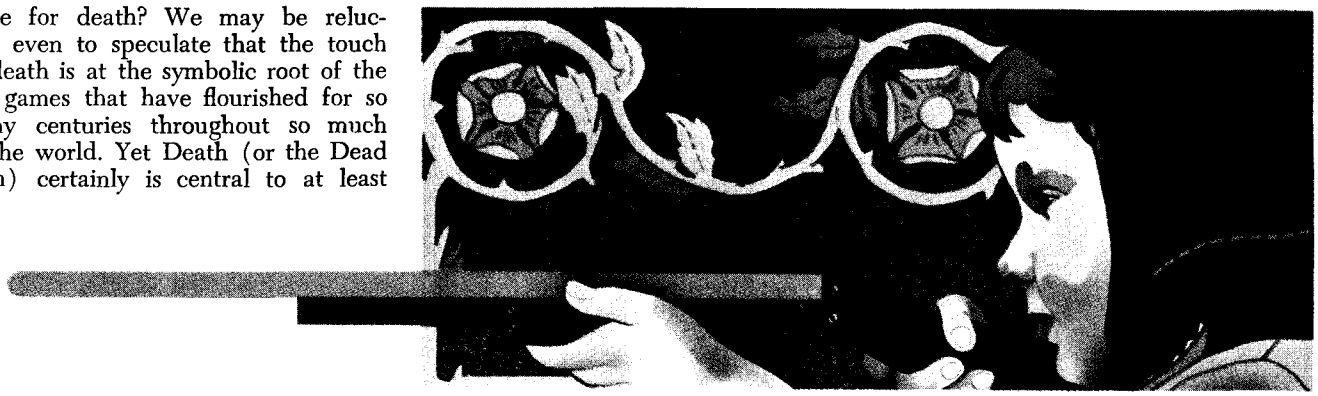
Although children today continue to participate in rituals that can be traced centuries back, other death-attuned merriments such as "bang, bang, you're dead!" are of more recent origin, and the repertoire is constantly freshened. When everyday group games do not provide a sufficient outlet for death-oriented play, children are likely to express their own special thoughts and feelings individually through inventive play. Suffocating and burying a doll is an instance of fulfilling a death fantasy. Similarly, a game of repeatedly crashing toy cars into each other or a model plane into the ground effectively permits a youngster to test out feelings that are evoked in certain real situations. Should an adult happen to interrupt this brutal type of play, the youngster may offer some reassuring comment, such as "Nobody gets killed bad" or "All the people come home for supper."

How death becomes a vital element in what we call child's play was illustrated by my eight-year-old son at home just a few weeks ago. David, for no ostensible reason, went to the piano and improvised. A short while later he moved to the floor near the piano and began stacking his wooden blocks. These two spontaneous actions did not have any apparent relationship to each other, nor did they bear the mark of death awareness. Yet the only way to appreciate David's behavior is in terms of response to death and loss. The piano playing and block building occurred within a half-hour of the time David and I had discovered our family cat lying dead in the road. Together we acknowledged the death, discussed the probable cause, shared our surprise and dismay, and removed the body for burial in the woods. David then went his own way for a while, which included the actions already mentioned.

When I asked what he was playing on the piano, David answered, "Lovey's life story." He explained how the various types of music he had invented represented memorable incidents in the life of his lost cat (e.g., "This is music

Some small detail related to death, such as a funeral wreath or the design of a casket, often makes more of an impression on a child's memory than do recollections about the deceased.

Games of make-believe violence, using realistic toys for weapons, allow children to explore feelings that are evoked in real situations.



PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

for when she scratched my arm"). The wooden blocks turned out to be a monument for Lovey. A close look revealed that the entire building was constructed in an *L* shape, with several other *Ls* at salient points.

If there had been no sharing of the initial death experience, I probably would not have guessed that David's play had been inspired by an encounter with mortality. Adults often fail to fathom the implications of children's play because they have not had the opportunity to perceive the stimulus. It is very easy to misinterpret what children are doing, because the nature of their play does not necessarily convey the meaning behind the activity (children go to the piano or their blocks for many other reasons than memorializing). The fact that a particular behavior does not seem to be death-related by no means rules out the possibility that it must be understood at least partially in those terms.

More systematically now, let us explore the child's relationship to death from encounters with both tragedy and games, starting in infancy. Although the young child does not comprehend death as a concept in the strictest sense of the term, death themes certainly engage his mind very early in life, and they are intimately related to the central development of his personality.

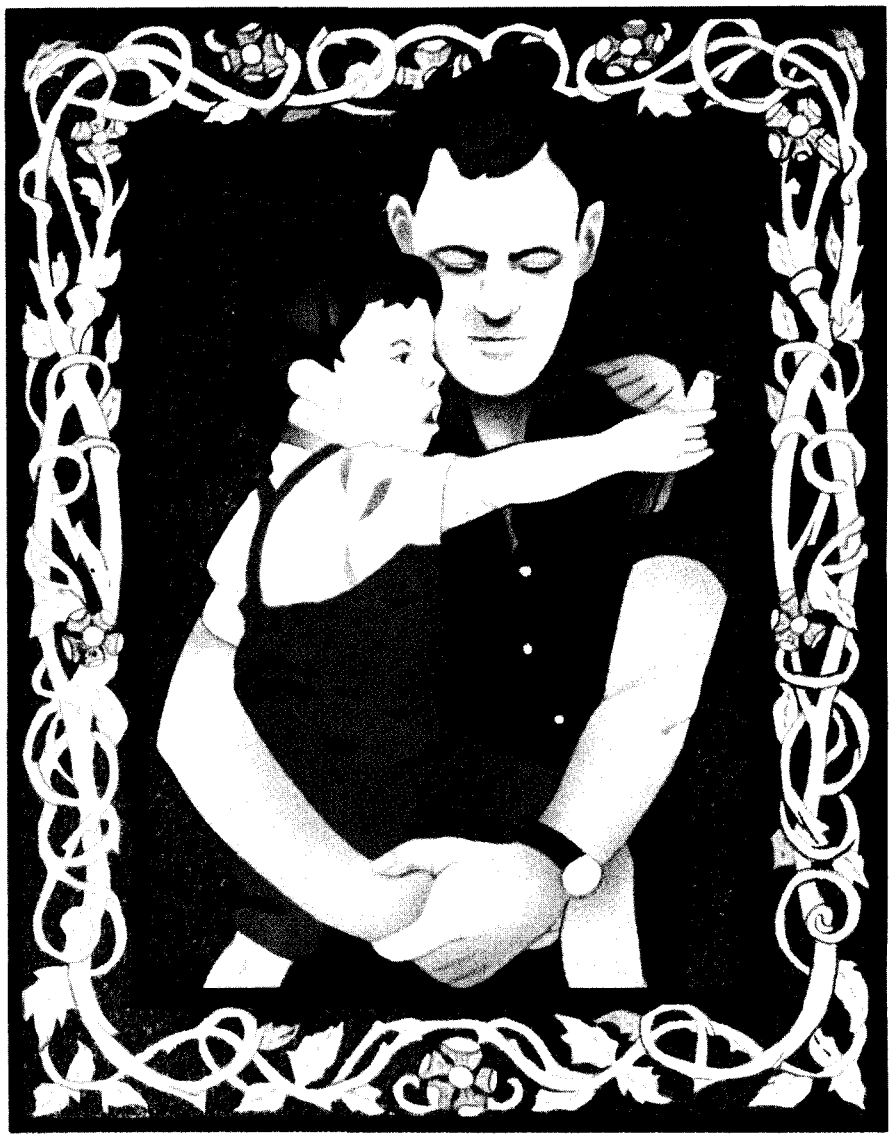
There are two different, although related, realizations that children must eventually develop. The first is that other people die, and the second is that they themselves will die. One of the earliest inquiries into the psychology of death touched upon the question of the child's exposure to the death of others. Around the turn of the century G. Stanley Hall, one of the most distinguished of this nation's first generation of psychologists, and one of his students conducted a study on adult recollections of childhood. Several of the questions they asked concerned early encounters with death. Interestingly, many of the earliest memories involved death in one form or another.

When asked specifically about their earliest experiences with death, many of Hall's respondents answered with considerable detail. He later wrote that ". . . the first impression of death often comes from a sensation of coldness in touching the corpse of a relative and the reaction is a nervous start at the contrast with the warmth that the contact of cuddling and hugging was wont to bring. The child's exquisite temperature sense feels a chill where it formerly felt heat. Then comes the immobility of face and body where it used to find prompt movements of response. There is no answering kiss, pat, or smile. . . . often the half-opened eyes are noticed with awe. The silence and tearfulness of friends are also impressive to the infant, who often weeps reflexly or sympathetically."

Taking careful note of mental reactions to the elaborate funeral proceedings of the era, Hall observed that "little children often focus on some minute detail (thanatic fetishism) and ever after remember, for example, the bright pretty handles or the silver nails of the coffin, the plate, the cloth binding, their own or others' articles of apparel, the shroud, flowers, and wreaths on or near the coffin or thrown into the grave, countless stray phrases of the preacher, the fear lest the bottom of the coffin should drop out or the straps with which it is lowered into the ground should slip or break, a stone in the first handful or shovelful of earth thrown upon the coffin, etc. The hearse is almost always prominent in such memories and children often want to ride in one."

Some adult memories of death went back to age two or three. A child that young could not interpret or symbolize death in anything approaching the adult mode. Yet the exposure to death seemed to make a special impression. Possibly what happens is that the memory is preserved in details of the perception. The scene, or some of its elements that are easily overlooked by an adult, remains charged with emotion and vividly etched in the child's mind. When the adult turns the pages back to early childhood, he cannot show us the text, only the pictures. We do not yet know very much about the place of these early death portraits in the process of individual development, nor can we say with certainty what happens when such seldom-reviewed memories are brought to light in the adult years. However, it is likely that many of us have death perceptions engraved at some level of our memory that predate our ability to preserve our

By sharing an early death experience, whether it is the loss of a pet, a wild animal, a person, or even a plant, parents have an opportunity to begin to sense the poignancy with which their children learn about mortality.



PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

experiences in the form of verbal concepts.

Another way to study the impact of death upon a young child is to learn how he responds to the actual loss of somebody close to him. Albert Cain and his colleagues at the University of Michigan have found that a pattern of disturbed behavior often follows a death in the family. The symptoms occasionally become part of the child's personality from that time forward. One of Cain's studies focused upon responses to the death of a brother or sister. Guilt, as might be expected, was one of the more frequent reactions. "In approximately half our cases," reports Cain, "guilt was rawly, directly present. So, too, was trembling, crying and sadness upon mention of the sibling's death, with the guilt still consciously active five years or more after the sibling's death. Such children felt responsible for the death, sporadically insisted that it was all their fault, felt they should have died, too, or should have died instead of the dead sibling. They insisted they should enjoy nothing, and deserved only the worst. Some had suicidal thoughts and impulses, said they deserved to die, wanted to die—this also being motivated by a wish to join the dead sibling. They mulled over and over the nasty things they had thought, felt, or said to the dead sibling, and became all the guiltier. They also tried to recall the good things they had done, the ways they had protected the dead sibling, and so on."

Many other types of problems were noted in the same study. Some young children developed distorted ideas of what is involved in both illness and death, leading them to fear death for themselves at almost any time or to fantasize that the adults had killed their siblings—fantasies often fed by misinterpretations of emergency respiration and other rescue procedures. The surviving children sometimes became very fearful of physicians and hospitals or resented God as the murderer of their siblings. A few children developed major problems in mental functioning; they suddenly appeared "stupid," did not even know their own age, and seemed to lose their sense of time and causation.

The loss of an expected family member who was not yet born also proved unsettling to many of the children observed by Cain. Although miscarriage, as an event, was difficult for the young child to understand, it was clear enough that something important had gone wrong. Evasive answers by anxious parents increased the problem for some children. In the absence of accurate knowledge they created fantasies that the fetus had been abandoned or murdered. One child insisted that his mother had thrown the baby into a garbage can in a fit of anger; another associated the miscarriage with guppies that eat their babies. At times the insistent questioning by the child had the effect of further unsettling his parents, who had not yet worked through their own feelings about the miscarriage.

The death of a brother or sister leads to guilt and, at times, dramatic personality changes in children. The feeling of responsibility for the death in one way or another can last on a conscious level for as long as five years or more, causing poor academic achievement, accident-prone behavior, or punishment seeking.

Not all children become permanently affected by death in their family. Some weather the emotional crisis with the strong and sensitive help of others. The point is simply that death registers in the minds of young children whether or not adults are fully cognizant of the phenomenon. It need not be either a sibling death or a miscarriage. The death of a playmate, the man across the street, a distant relative, a pet, a sports hero, or a national political figure all make an impression somewhere in the child's mind. Real death is not a rare event in the child's world.

There is no precise way of knowing which death will make the greatest impact upon which child. The death of a pet, especially if it is the first death exposure or occurs in a striking manner, sometimes affects a youngster more than the subsequent death of a person. There is nothing automatic about the different responses to death, even in childhood. Nor can the seemingly inconsequential or remote death be disregarded if we wish to understand the child's thoughts and feelings on mortality.

Whatever the impact of other deaths, however, the loss of a parent has the most signal and longest-lasting influence on children. Bereavement in early childhood has been implicated as the underlying cause of depression and suicide attempts in later life. In one British study, for example, it was found

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

that boys age four or younger who had lost their fathers were especially vulnerable to severe depression in adulthood. Many of the fathers died in combat. Perhaps some of the psychiatric and physical casualties of our involvement in Vietnam eventually will include the suicide committed in 1990 by the son whose father did not return. The death of a young father, however, does not automatically determine his son's fate. There is no way to predict the surviving child's response. In fact, the responses themselves cannot be explained entirely on the basis of parental death alone. What registered in the child's mind when his parent died? By what process did this first response develop into a way of life or into a sort of psychological time bomb set for later detonation? How might the child have been protected or guided? These questions have been raised only sporadically, and the answers are still elusive.

The significance of experiencing another's death during childhood has prompted many psychotherapists to look for such encounters in their adult patients. Psychiatrist David M. Moriarty, for example, has described a depressed woman who had attempted suicide on three occasions and had received electro-shock therapy twice without notable improvement in her behavior. When she was three years old, her mother had died of appendicitis. In the course of treatment she would call her psychiatrist in a panic, feeling that the world was coming in on her. The thought behind this fear was traced to the graveyard scene, when a shovelful of dirt had been thrown on the lowered coffin. Dr. Moriarty concluded that "Mrs. Q. lived most of her life afraid that she would lose other people whom she loved. The most impressive fact was that she talked and thought about the death of her mother as if it had just happened. This tragic event of forty years ago was still uppermost in her mind."

Of all the methods used to piece together the meaning of death during childhood, none can replace the sharing of a direct death experience with a young child. It is only in such moments of fortunate sharing that we have a clear glimpse into the child's face-to-face encounter with death. There is something indescribably poignant about the way in which the young child attempts to attune himself to threat, limitations, and mortality at a time when he would appear to be innocent of dark concerns. In a journal that I have kept for each of my children, I recorded my son's first encounter with death.

David, at eighteen months, was toddling around the back yard. He pointed at something on the ground. I looked and saw a dead bird, which he immediately labeled "buh . . . buh." But he appeared uncertain and puzzled. Furthermore, he made no effort to touch the bird. This was unusual caution for a child who characteristically tried to touch or pick up everything he could reach. David then crouched over and moved slightly closer to the bird. His face changed expression. From its initial expression of excited discovery and later of puzzlement, now it took on a different aspect: to my astonishment, his face was set in a frozen, ritualized expression resembling nothing so much as the stylized Greek dramatic mask of tragedy. I said only, "Yes, bird . . . dead bird." In typically adult conflict, I thought of adding, "Don't touch," but then decided against this injunction. In any event, David made no effort to touch.

Every morning for the next few days he would begin his morning explorations by toddling over to the dead-bird-place. He no longer assumed the ritual-mask expression but still restrained himself from touching. The bird was allowed to remain there until greatly reduced by decomposition. I reasoned that he might as well have the opportunity of seeing the natural processes at work. This was, to the best of my knowledge, David's first exposure to death. No general change in his behavior was noted, nor had any been expected. The small first chapter had concluded.

But a few weeks later a second dead bird was discovered. David had quite a different reaction this time. He picked up the bird and gestured with it. He was "speaking" with insistence. When he realized that I did not comprehend his wishes, he reached up toward a tree, holding the bird above his head. He repeated the gesture several times. I tried to explain that being placed back on the tree would not help the bird. David continued to insist, accompanying his command now with gestures that could be interpreted as a bird flying. All too predictably, the bird did not fly when I returned it to the tree. He insisted that the effort be repeated several times; then he lost interest altogether.

There was a sequel a few weeks later—by now autumn. David and I were walking in the woods, sharing many small discoveries. After a while, however, his attention became thoroughly engaged by a single fallen leaf. He tried to place it back on the tree himself. Failure. He gave the leaf to me with "instructions" that the leaf be restored to its rightful place. Failure again. When I started to try once more, he shook his head no, looking both sober and convinced. Although leaves were repeatedly seen to fall and dead animals were found every now and then, he made no further efforts to reverse their fortunes.

David's look of puzzlement and his repeated efforts to reverse death suggest that even the very young child recognizes a problem when he sees one. Indeed, the problem of death very well might be the prime challenge that sets into motion the child's curiosity and mental questing. Instead of constituting only an odd corner of the young child's mental life, death and its related problems may, in fact, provide much of the motivation for his intellectual development. Children obviously do not possess the conceptual structures of the adult; nevertheless, they do try to understand. Curiosity about death and "where things go" is part of a child's early motivation for exploring his environment. While many developmentalists have observed how the young child comes to an appreciation of object constancy, few have noted that this mental achievement is not possible unless there is also an appreciation of inconstancy. In other words, the young child must be aware of changes, losses, and disappearances if he is eventually to comprehend what "stays," what "goes," and what "comes and goes." Even very young children encounter losses, ends, and limits. Without an ability to fathom these experiences, they could not form proto-concepts of constancies, beginnings, and possibilities.

The death of animals, relatives, or friends undoubtedly has some relationship to the child's discovery of his own mortality, but there are other observations that are more germane. Adah Maurer, a school psychologist in California, suggests that an infant as young as three months old has the glimmerings of death awareness. For a while the baby alternates between sleeping and waking states, with biological imperatives having the upper hand. Soon, Maurer says, "the healthy baby is ready to experiment with these contrasting states. In the game of peek-a-boo, he replays in safe circumstances the alternate terror and delight, confirming his sense of self by risking and regaining complete consciousness. A light cloth spread over his face and body will elicit an immediate and forceful reaction. Short, sharp intakes of breath, vigorous thrashing of arms and legs removes the erstwhile shroud to reveal widely staring eyes that scan the scene with frantic alertness until they lock glances with the smiling mother, whereupon he will wriggle and laugh with joy. . . . To the empathetic observer, it is obvious that he enjoyed the temporary dimming of the light, the blotting out of the reassuring face and the suggestion of a lack of air which his own efforts enabled him to restore, his aliveness ad-

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

By the time they are about nine years old, most children realize that death is final, universal, and inevitable.

ditionally confirmed by the glad greeting implicit in the eye-to-eye oneness with another human."

Babies a few months older begin to delight in disappearance-and-return games. Overboard goes a toy, somebody fetches it, then overboard again. The questions When is something gone? and When is it gone "forever"? seem very important to the young explorer. He devises many experiments for determining under what conditions something is "all gone." Maurer suggests that we "offer a two-year-old a lighted match and watch his face light up with demonic glee as he blows it out. Notice the willingness with which he helps his mother if the errand is to step on the pedal and bury his banana peel in the covered garbage can. The toilet makes a still better sarcophagus until he must watch in awed dismay while the plumber fishes out the Tinker-toy from the overflowing bowl."

It makes sense to take these activities seriously. They provide early clues as to how children begin to grasp what "all gone" means. Once children are old enough to begin talking in sentences, part of their verbal repertoire usually includes death words. One conversation between a four-year-old girl and her eighty-four-year-old great-grandmother illustrates the preschool-age child's concept of death: "You are old. That means you will die. I am young, so I won't die, you know." This excerpt suggests that the little girl knows what it means to die, even if she has not entirely grasped the relationship between age and death. However, a moment later she adds: "But it's all right, Gran'mother. Just make sure you wear your white dress. Then, after you die, you can marry Nomo [great-grandfather] again, and have babies."

The words "dead" and "die" are fairly common in children's conversation and often are used with some sense of appropriateness. Yet an extra comment such as "you can marry Nomo again" or a little adult questioning frequently reveals that a child's understanding of death is quite different from an adult's. Psychologist Maria Nagy, studying Hungarian children in the late 1940s, discovered three phases in the child's awareness of personal mortality. Her interpretation of death ideas expressed by three- to ten-year-olds in drawings and words are classic.

Stage one: present until about age five. The preschool child usually does not recognize that death is final. Being dead is like being less alive. The youngest children regard death as sleep or departure. Still, there is much curiosity about what happens to a person after he dies. The children "want to know where and how he continues to live. Most of the children connected the facts of absence and funerals. In the cemetery one lives on. Movement . . . is limited by the coffin, but for all that, the dead are still capable of growth. They take nourishment, they breathe. They know what is happening on earth. They feel it if someone thinks of them and they even feel sorry for themselves." Death disturbs the young child because it separates people from each other and because life in the grave seems dull and unpleasant.

Stage two: between the ages of five and nine. The distinguishing characteristic of this stage is that the child now tends to personify death. Death is sometimes seen as a separate person —for example, an angel or a frightening clown. For other children death is represented by a dead person. Death usually makes his rounds in the night. The big shift in the child's thinking from stage one is that death now seems to be understood as final: it is not just a reduced form of life. But there is still an important protective feature here: personal death can be avoided. Run faster than the Death Man, lock the door, trick him, and you will not die, unless you have bad luck. As Nagy puts it, "Death is still outside us and is also not general."

Stage three: ages nine to ten and thereafter. The oldest children in Nagy's study recognized that death was not only final but also inevitable. It will happen to them, too, no matter how fast they run or how cleverly they hide. "It is like the withering of flowers," a ten-year-old girl explained to the psychologist.

Nagy's stages offer a useful guide to the development of the child's conception of death, but not all observations fit neatly into these three categories. There are instances in which children as young as five realize their own inevitable mortality. A six-year-old boy worked out by himself the certainty of death. In a shocked voice he revealed, "But I had been planning to live forever, you know." A five-year-old reasoned aloud: "One day you [father] will be died. And one day Mommy will be died . . . . And one day even Cynthia [little sister], she will be died, I mean dead, too . . . . [pause] And one day *I* will be dead . . . . [long pause] *Everybody* there is will be dead . . . . [long, long pause] That's sad, isn't it?" This insight is several years ahead of schedule and is even farther ahead of what one would expect from most theories of mental growth.

Apparently, it is possible to grasp the central facts of death at a surprisingly early age. Children probably tend to retreat from this realization when it comes so early and for several years fluctuate between two states of belief: that death is final and inevitable, and that death is partial, reversible, and perhaps avoidable.

My research indicates that the orientation many adolescents have toward death also fluctuates between a sense of invulnerability and a sense of impending, castastrophic wipeout. Some adults reveal a similar tendency to function at two levels of thought: they "know" that death is final and inevitable, of course, but most of their daily attitudes and actions are more consistent with the belief that personal mortality is an unfounded rumor.

Sooner or later most children come to understand that death is final, universal, and inevitable. Parents might prefer that children remain innocent of what is happening in their lives and sheltered from emotional stress, shock, and anguish. But it is our own make-believe, not theirs, if we persist in behaving as though children are not attuned to the prospect of mortality. It is important to remember that in this century millions of children around the world have grown up literally in the midst of death and the threat of death. They have fewer illusions on the subject than do many adults.

"The kingdom where nobody dies," as Edna St. Vincent Millay once described childhood, is the fantasy of grownups. We want our children to be immortal—at least temporarily. We can be more useful to children if we can share with them realities as well as fantasies about death. This means some uncomfortable moments. Part of each child's adventure into life is his discovery of loss, separation, nonbeing, death. No one can have this adventure for him, nor can death be locked in another room until a child comes of age. At the beginning the child does not know that he is supposed to be scared of death, that he is supposed to develop a fabric of evasions to protect himself, and that his parents are not to be relied upon for support when it really counts. He is ready to share his discoveries with us. Are we? □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The plain truth about your sweet tooth

Do you recall the messages we brought you in the past about sugar? How something with sugar in it before meals could help you curb your appetite?

We hope you didn't get the idea that our little diet tip was any magic formula for losing weight. Because there are no tricks, or shortcuts, the whole diet subject is very complicated. Research hasn't established that consuming sugar before meals will contribute to weight reduction or even keep you from gaining weight.

But if sugar isn't thinning, it isn't fattening either.

Because no food, in and of itself, is fattening. (And sugar is most definitely a good and useful food.) You'll gain weight if you consistently take in more calories than you need for energy. You'll lose weight if you consistently take in less calories than you burn up.

But whether you're gaining or losing, you should take in a balanced diet, and that's where sugar comes in.

You need vitamins, minerals, proteins, fats and carbohydrates. And it just so happens that sugar is the best tasting carbohydrate.

It's a food you enjoy. A food that is absorbed into your bloodstream rapidly so it helps you bounce back.

And that good natural sweetness gives you a sense of satisfaction and well-being. A nice little psychological lift

You want to lose weight? Your doctor will tell you to exercise more and eat less, but stick with a balanced diet. And sugar, in moderation, has a place in a diet like that.

Sugar. It isn't just good flavor; it's good food.

For more facts about good nutrition, and sugar's role in it, write:
Sugar Information, General P.O. Box 94,
New York, New York 10001.

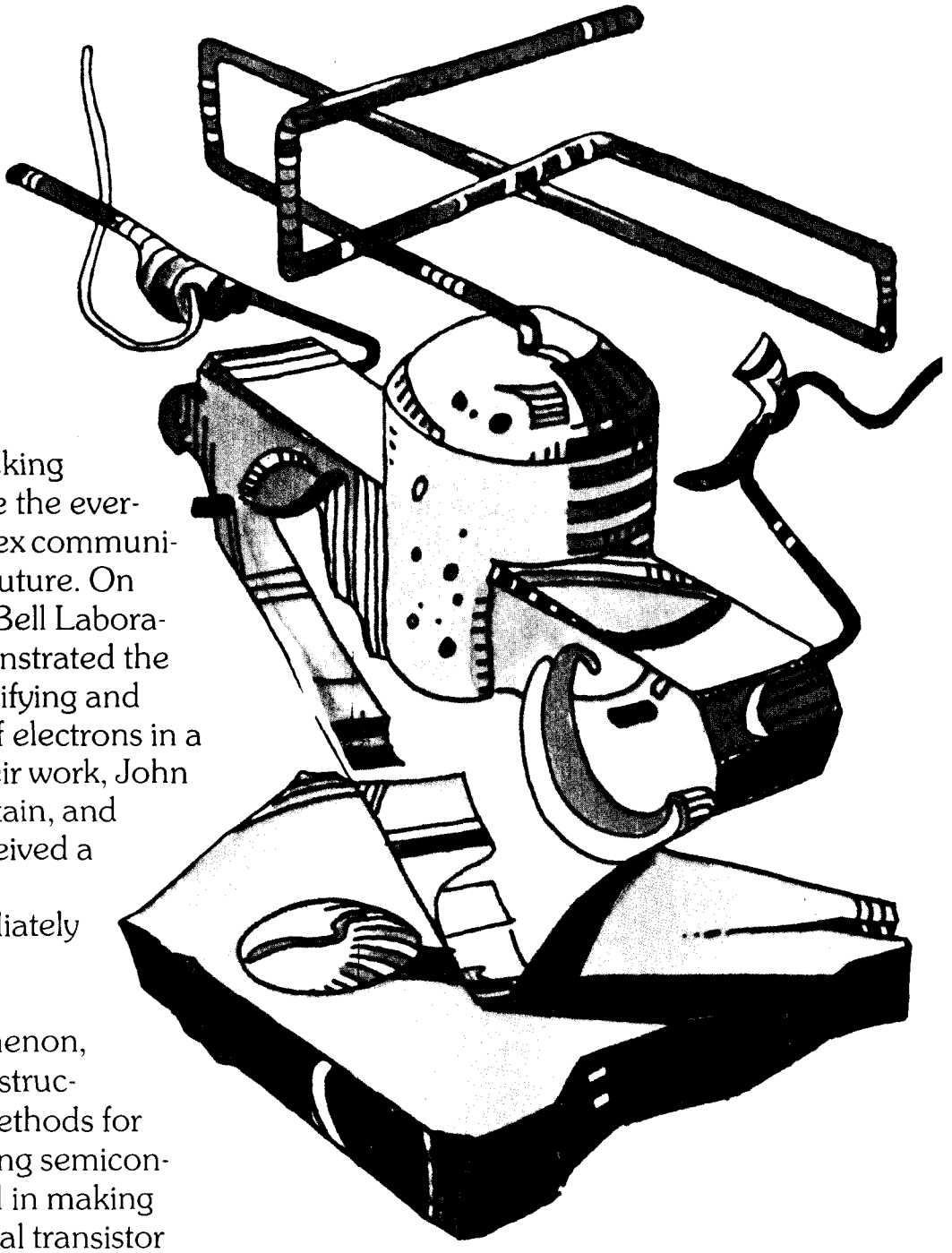
PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Since Bell Labs invented the transistor...

...25 years ago, the world hasn't been the same! The transistor has revolutionized communications. It spawned the whole new solid-state electronics industry.

Yet the transistor was invented by telephone people seeking a better way to handle the ever-growing, more complex communications needs of the future. On December 23, 1947, Bell Laboratories scientists demonstrated the transistor effect, amplifying and controlling the flow of electrons in a solid material. For their work, John Bardeen, Walter Brattain, and William Shockley received a Nobel Prize.

Bell Labs immediately mounted a major effort to understand fully the new phenomenon, devise new transistor structures, and develop methods for preparing and purifying semiconductor materials used in making transistors. The original transistor evolved into today's "integrated circuit," combining large numbers of transistors, diodes, and resistors on a single chip of

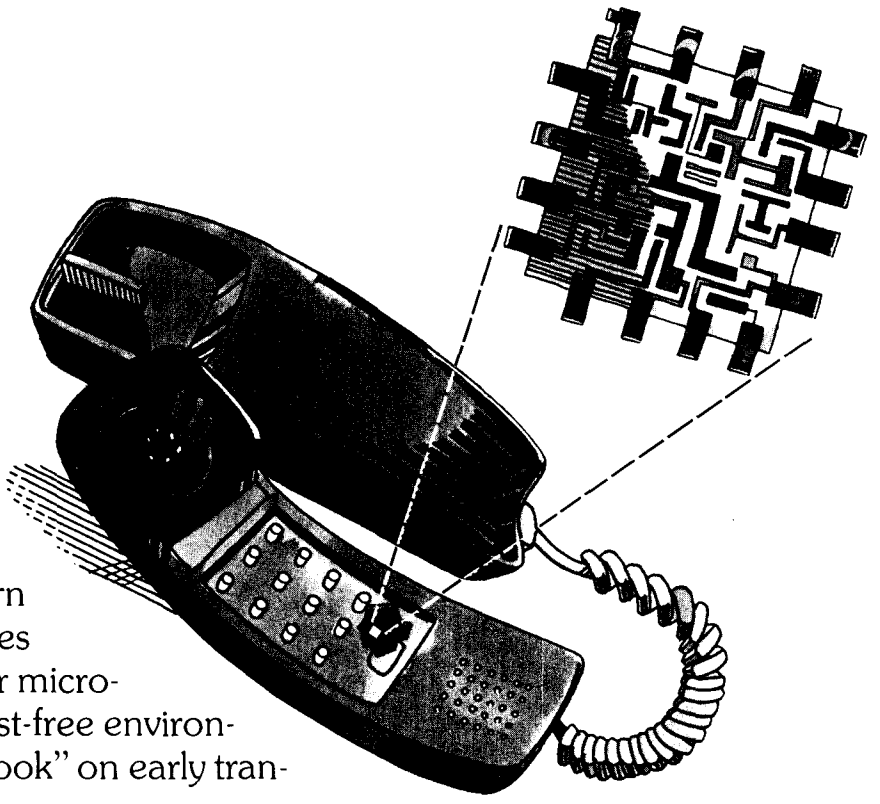


The first transistor shown about 10 times actual size.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

semiconductor material.

Western Electric applied its manufacturing expertise to produce economically hundreds of millions of transistors for telephone uses. Western designed and built factories where work is done under microscopes in super-clean, dust-free environments. They "wrote the book" on early transistor manufacture.



Compact Touch-Tone® phones use integrated circuits—an outgrowth of the transistor.

In the Bell System, transistors and other semiconductor devices have made possible Touch-Tone® dialing, high-speed data transmission, and highly reliable underseas cables. New switching machines provide telephone connections rapidly and offer new services such as transferring your calls automatically to another number.

Western Electric and Bell Labs made transistor information available outside the Bell System. Hundreds of diverse products such as television sets, hearing aids, space satellites, high-speed computers, and the ubiquitous pocket radio now use transistors. In the USA alone, nearly eight million people are employed producing equipment using transistors and other semiconductor devices.

All this started 25 years ago. Yet the same philosophy of technical innovation that created and made practical the transistor still operates today in Bell Labs and Western Electric.

Bell Labs
Western Electric

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

They taught him everything he knows (about Peter Heering)

It's not surprising that they were the first to discover Peter Heering... attracted by pure flavor, natural color and exotic bouquet. He got the message. So today Peter Heering is his and hers. Yours?

49 PROOF LIQUEUR. IMPORTED BY W. A. TAYLOR & CO., NEW YORK, N. Y.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

TAMBORA AND KRAKATAU: VOLCANOES AND THE COOLING OF THE WORLD

BY KENNETH E. F. WATT

You have every reason to be confused as to the possible effects of pollution on the weather. Some scientists have predicted that increasing global air pollution will reduce the amount of solar energy penetrating the atmosphere. This, they say, will cause a decline in the global average air temperature. Other scientists say the earth's weather will warm up. This, it is explained, will come about because of the increase in carbon dioxide concentration in the atmosphere. Since carbon dioxide is a strong absorber of infrared radiation, it will act like the glass roof that prevents loss of heat energy from inside a greenhouse—the infamous "greenhouse effect"—and trap radiation in the atmosphere.

Three types of arguments can be put forth to settle the matter as to which mechanism will be most important. One approach is to argue from mathematical theories of climate determination, using computer-simulation studies. This line of argument is not completely trustworthy, because of the embryonic state of such theories. A second line of argument, pursued by Reid Bryson and Wayne Wendland at the University of Wisconsin, is to discover by statistical analysis the relative strengths of the two processes during recent decades. They found that the impact of the temperature-lowering mechanism will override the impact of the temperature-raising mechanism. Since the temperature has in fact been dropping for more than two decades, their argument is compelling.

Kenneth Watt, who writes regularly for SR, *is a systems ecologist at the University of California, Davis.*

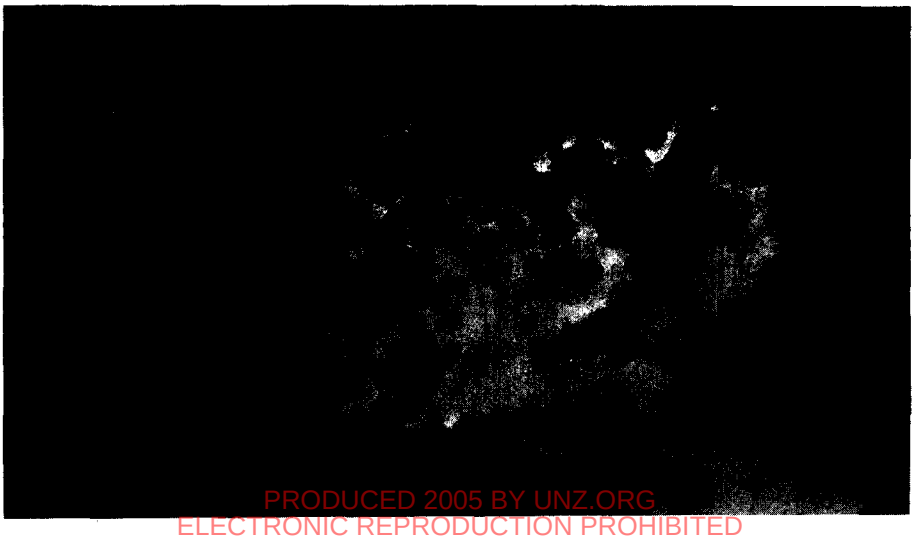
However, a third line of argument opens up a most fascinating area of research, both in interpretation of history and in climatological prediction. This argument asserts that the most realistic means of assessing the effect of air pollution is to find some gigantic natural event in the past that operated in a way analogous to modern pollution. Fortunately, we are provided with such historical "experiments" by records of a few particularly gigantic and explosive volcanic eruptions.

A close reading of old newspapers gives evidence that people in the early nineteenth century were not aware of any relationship between unusual weather and volcanoes. To my knowledge, most ancient civilizations thought that the earth's weather was almost totally determined by astronomical phenomena, and this belief explains the spectacular development of observational astronomy in those civilizations. The first man known to have recognized that volcanoes could affect the weather was Benjamin Franklin in 1784, following a series of enormous eruptions in Japan and Iceland the previous year. During the twentieth century many climatologists and geophysicists have come to suspect that volcanoes influenced weather and climate and, more recently, that they had effects similar to the global increase in atmospheric pollution.

There are two obvious sources of information on the impact volcanic eruptions could have on weather and hence on crop production. One is the tables of past weather data recently constructed by historical climatologists such as Gordon Manley and H. H. Lamb. The other is old newspapers, which yield detailed information on local weather, crop growing, planting and harvesting conditions, and agricultural commodity prices.

Consider the effect of the eruption of Tambora in Sumbawa, the Dutch East Indies, in April of 1815. This was the largest known volcanic eruption in recorded history: over the period 1811 to 1818 an estimated 220 million metric tons of fine ash were ejected into the stratosphere. Of this, 150 million metric tons were added to the stratospheric load in 1815 alone, mostly in April. Krakatau, which is much better known because it erupted more recently (1883), ejected only 50 million metric tons of ash into the global stratosphere. It is now known that the ash from certain of these very large and explosive volcanic eruptions spreads worldwide in a few weeks and does not sink out of the atmosphere totally until a few years have elapsed. During all of this time the ash is back-scattering incoming solar radiation outward into space and consequently chilling the earth.

The magnitude of the chilling can be ascertained from Manley's tables for central England. The Tambora volcano erupted most explosively in April of 1815; by November the average temperature of central England had dropped 4.5° F. The following twenty-four months was one of the coldest times in English history. Specifically, 1816 was one of the four coldest years in the period 1698 to 1957; the coldest July in the 259-year period was in 1816; October of 1817 was the second coldest October; May of 1817 was the third coldest May. However, these figures convey little sense of the impact



PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

of such chilling on society. For that we must turn to the newspapers of the time. All of the following quotations are from *Evans and Ruffy's Farmers' Journal and Agricultural Advertiser.*

"We had fine mild weather until about the 20th, when it set in cold, with winds at East and North-East, with partial frosts; these together have greatly retarded the operations in Agriculture, and very many cannot purchase seed corn, so that thousands of acres will pass over untilled, and sales of farming stock, and other processes in law, drive many of this useful class in society into a state of despondency. . . . The wheats, late sown . . . have been partially injured by the frosty mornings. . . . Sheep and lambs have suffered from the severity and variableness of the weather. . . . The doing away the Income Tax, and the war duty on Malt, will afford some relief, but are wholly insufficient in themselves to restore this country to its former state of happiness and prosperity." (April 8, 1816)

"From about the 9th or 10th of this month, we have never had a day without rain more or less, sometimes two or three days of successive rain with thunder storms. The hay is very much injured; a considerable part of it must have laid on the ground upwards of a fortnight. . . . Wheat is looking as well as can be expected, considering the deficiency of plants in the ground, and those very weakly . . . but still far short of an average crop." (August 12, 1816)

"Throughout the whole month the air has been extremely cold; there has not been more than two or three warm days, being at other times rather cloudy and dark, and the sun seldom seen. The Oats . . . on high situated ground . . . are the most backward and miserable crop ever seen . . . for the greater part of the Wheat, where the mildew did not strike, has been very much affected by the rust or canker in the head. . . . There have been many seizures for rent this month, and many a farmer brought to nothing, and we hear of very few gentlemen who are inclined to lower their farms as yet; it seems they are determined to see the end." (September 9, 1816)

The preceding quotations all refer to agricultural conditions in England. To indicate that this was a worldwide rather than a local phenomenon, the following quotation, from a letter printed in the same newspaper, suggests the state of affairs in other countries.

"Last year was an uncommon one, both in America and Europe: We had frosts in Pennsylvania every month the year through, a circumstance altogether without example. The crops were generally scant, the Indian Corn particularly bad, and frost bitten; the crops, in the fall and in the spring, greatly injured by a grub, called the cutworm . . . ." (November 10, 1817).

Thus, in the case of a volcano, which puts an immense load of pollution into the atmosphere suddenly—unlike modern pollution, which builds up gradually—we have a gigantic experiment, the effects of which can be clearly traced throughout all social and economic systems. For example, the volcano of 1815 had a clear-cut influence on world agricultural-commodity markets, as one would expect from the preceding descriptions of the consequences of weather deterioration on crops. Many measures of market conditions could be used to make this point, but the one I have selected is the highest asking price for best-quality flour within a month of trading on the London commodities market. The following table shows how this price changed, from the period before the volcano, to the peak price in June of 1817, to the normal price, which was finally reached again by the end of December 1818.

The table indicates how volcanic

HIGHEST ASKING PRICE FOR A SACK OF FLOUR (IN SHILLINGS)

Year	June	December
1814	65	65
1815	65	58
1816	75	105
1817	120	80
1818	70	70*

(*65 by end of month)

eruptions can serve as the basis for interdisciplinary research, in which a pulse due to a physical event can be tracked through biological, social, economic, and political phenomena.

For example, an interesting feature of this table is the long lag between the time the pollution was introduced into the upper atmosphere and the time that the price elevation was at its peak (April 1815 to June 1817—twenty-six months). These time lags are characteristic of complex systems and indicate why cause and effect are often not connected in peoples' minds: by the time the effect has occurred, everyone has forgotten the cause.

Could the gradual increase in worldwide air pollution concentrations become serious enough to bring crop production to a halt in high latitudes? To answer this question, we must consider the rate of build-up in pollution now and the likelihood that political power to enforce adequate pollution control will materialize.

The worldwide stratospheric particulate loading due to Krakatau and Tambora was 50 and 220 million metric tons respectively. If worldwide man-caused stratospheric particulate loading continues to build up at recently prevailing rates, the following table indicates the likely outcome.

WORLDWIDE STRATOSPHERIC PARTICULATE LOADING DUE TO MAN (MILLIONS OF METRIC TONS)

YEAR	
1970	2
2000	15
2010	30
2020	59
2030	116
2040	228

Thus, we see that by about 2018, if present trends continue, the permanent particulate load in the stratosphere would be equal to that produced temporarily by Krakatau, and by about 2039 the permanent load would be equal to that produced by Tambora.

Will they continue? The reader must make his own judgments. There is ample printed evidence testifying to the difficulty of requiring automobile manufacturers to conform to the limits required by the Clean Air Act of 1975. Also, a casual reading of industry journals does not suggest that industry would like to arrest the rate of increase in sales of oil, gas, coal, or other polluting substances. Computer-simulation studies of trends in the use of fossil fuels do not indicate any significant lessening of the rate of increase in pollution prior to about 2004 unless stringent controls are introduced. Thus, without a really massive political and social change of a type that does not seem likely, judging from present attitudes, the quotations from English farm newspapers in 1816 and 1817 may well be read as a scenario for the future.

There are further complications if these are not enough. What if man continues to build up the pollution load in the atmosphere, and then a volcano of the order of Tambora adds still more pollution to the atmosphere? How likely is this to happen? The answer is: very likely. The period since 1835 has been remarkably free of major volcanic eruptions of the explosive, Vesuvian type. But over the historical record an average of five very large volcanoes has occurred each century. Luckily for us, the modern period of great technological activity has been free from major volcanic eruptions, to an almost historically unique extent. But at some time our luck may run out.

Another complication is what is going on in the minds of people. The world population of 1816 had no idea that there was any relationship between the phenomenally bad weather they were experiencing and air pollution. Will we be any wiser? Can we change in time? Will we be able to take the necessary action to ensure a brighter end to the scenario for civilization? Simple extrapolation of present trends does not lead to an encouraging answer, but history teaches us that sudden, surprising changes in political and social attitudes do occur. Perhaps it will occur once more—in time. □

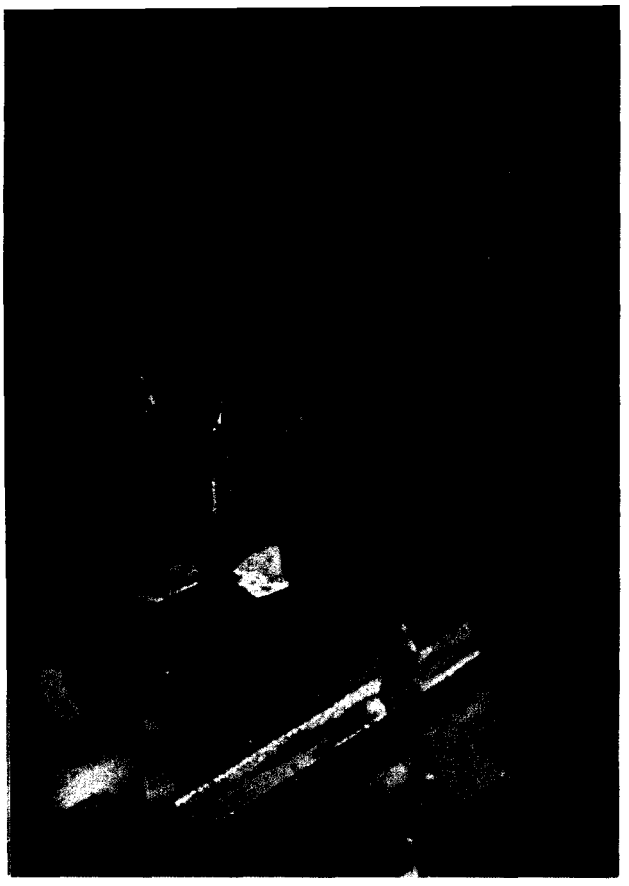
PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

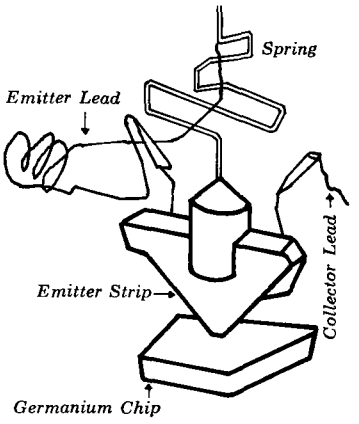
HAPPY BIRTHDAY, TRANSISTOR

BY ISAAC ASIMOV

ONLY TWENTY-FIVE YEARS OLD THIS MONTH.
THE TRANSISTOR IS STILL IN ITS INFANCY.
YET WITHOUT THIS TINY DEVICE OUR TECHNOLOGICAL
SOCIETY WOULD QUICKLY GRIND TO A HALT.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED





This point-contact transistor, one of Bell Labs' early experimental models, was one of the first examples of solid-state electronics.

On December 23, 1972, we celebrate the silver anniversary of the invention of a marvelous little gadget. The accent here is on the "little" because what this gadget gave us was not something really new but something unprecedentedly tiny.

The device, called the transistor, made it possible for us to take advantage of the marvels of technology without having to devote large volumes of space to them. Thanks to the transistor, electronic devices have become smaller and less energy consuming: small enough to be fired into space, tiny enough to be buried in a person's heart. Furthermore, the development of the transistor has pointed the way toward ever more compact, ever more precise, and ever more versatile computers that have as their ultimate goal something as compact, precise, and versatile as the human brain—or beyond.

And all in twenty-five years.

But science is all of a piece; there are no real beginnings or endings. To understand the transistor, we must go back well beyond its official birthday to 1883, when the American inventor Thomas Alva Edison was striving to improve his recently invented electric light.

The greatest flaw in his invention was the way in which the glowing filament, in its glass-enclosed vacuum, slowly evaporated as it remained at white-hot temperature and thus thinned and broke with continuing use. Edison, in his usual manner, tried everything he could think of to slow down this evaporation and lengthen the life of his light bulb. One of the things he tried was to seal a metal wire into the light bulb near the hot filament. Perhaps the presence of the wire would somehow lengthen the life of the filament. It didn't, but in testing the matter, Edison noted something odd. A distinct electric current could be detected in the metal wire, even though it was not connected to any source of electricity.

There was, to be sure, plenty of electric current in the filament, but that was separated from the wire by a vacuum gap. Could it have been that the current had leaped the gap? Edison reported his discovery of this phenomenon (it came to be called the Edison effect), but he could find no practical use for it and therefore let it slide.

The Edison effect remained unexplained for more than a decade. Then, in 1895, the first of the so-called subatomic particles was identified. It was called the electron.

All atoms contain electrons as part of their structures, and every electron carries a fixed quantity of something called an "electric charge." An atom contains electrons in its outer regions and in its interior possesses other particles, called "protons," each of which carries an electric charge equal in quantity to that of an electron but of an opposite nature. Purely arbitrarily, we call the electron's charge "negative" and the proton's charge "positive." An ordinary atom contains equal quantities of negative and positive charge, so that as a whole it is electrically neutral.

As it happens, opposite electric charges attract, and similar charges repel. An electron and a proton attract each other, while an electron repels another electron and a proton repels another proton.

The negatively charged electron, on the outskirts of the atom, is far lighter and more mobile than the positively charged proton at the atomic center. While the protons stay put, then, the electrons can move freely under the proper circumstances. It was found that the electric current was associated with the movement of electrons.

Once this connection between electrons and electricity was understood, the Edison effect quickly ceased to be a mystery. In experiments conducted between 1900 and 1903 the British physicist Owen Willans Richardson showed that when metal filaments were heated in a vacuum, electrons boiled out of the filament's atoms in a kind of subatomic evaporation. This explained the Edison effect. An electric current, in the form of speeding electrons, does leap the vacuum gap from white-hot filament to wire. (For this work Richardson received the Nobel Prize for physics in 1928.)

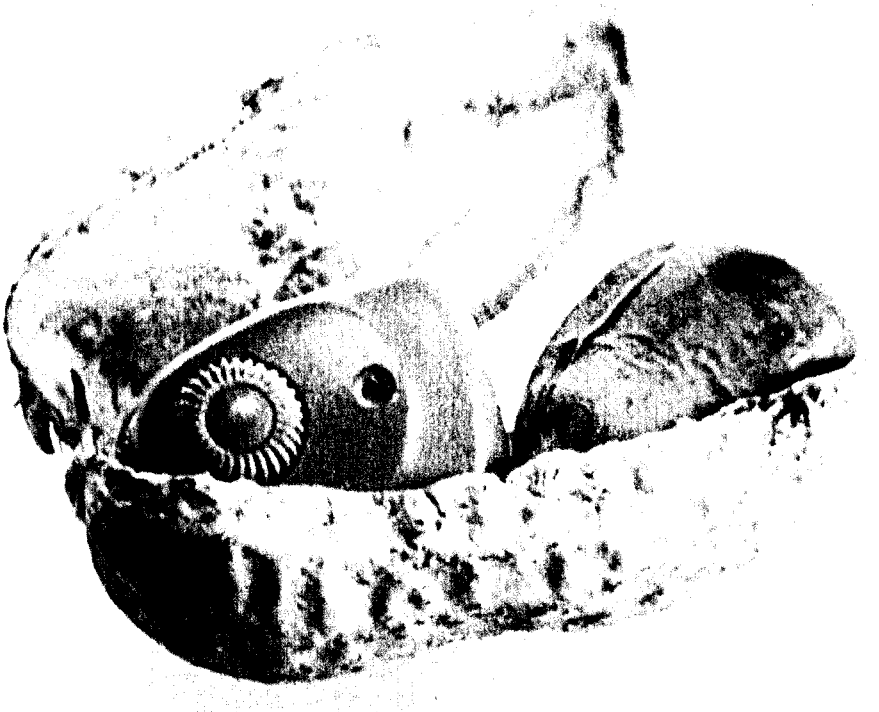
In 1904 the English electrical engineer John Ambrose Fleming put the Edison effect to brilliant use. He surrounded the filament in an evacuated bulb with a cylindrical piece of metal called a "plate."

Imagine the filament and plate hooked up to a source of alternating current. The current will run from the filament through the outside circuit to the plate, then reverse and run in the opposite direction, from plate to filament, then reverse again, and so on. The alternation in direction takes place many times a second. The thin wire of the filament offers sufficient resistance to the electric current so as to heat up through a kind of electrical friction; the broader plate offers much less resistance and does not heat up.

When the current moves in one direction, electrons move out of the plate, leaving it with a net positive charge, and pile into the filament, which gains a net negative charge. When the current moves in the other direction, the situation is reversed, and the plate gains

Isaac Asimov, a writer of fiction and nonfiction and an associate professor of biochemistry at Boston University Medical School, is the author of 130 books. His latest is Asimov's Annotated Don Juan, *published by Doubleday.*

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



The miniaturization spawned by transistors is displayed by a 1930s vintage Perceptron hearing aid (above) and a new transistorized model (right) from Zenith.

the negative charge, while the filament has the positive charge. Many times a second, then, the situation reverses itself: filament negative and plate positive, then filament positive and plate negative, and so on.

When the hot filament is negatively charged, it has an excess of negatively charged electrons and can easily emit them, since the plate is at that time positively charged. The positive charge attracts the electrons and helps suck them out of the filament. Between the push of the filament and the pull of the plate, the electrons leap the gap in quantity, and a current races through the entire circuit.

When the filament is positively charged, however, there are few electrons available for emission. What's more, the plate is at that time negatively charged, and the negative charge repels any electrons that may show up. Nor can the cold plate emit any electrons of its own. As a result, electrons do *not* leap the gap. There is what amounts to a break in the circuit. No current flows. In other words, although the outside source of current is alternating, the actual current that makes its way through the evacuated bulb is direct and flows in one direction only—from the filament to plate. The evacuated bulb, converting two-way motion to one-way, is now known as a "rectifier."

Fleming called his device a "valve" because it served to turn the electric current on and off, as an ordinary mechanical valve serves to turn the flow of water on and off. Until Fleming's time electric current had been turned on and off by the mechanical opening and closing of switches. Such devices are "mechanical" in nature. Fleming's valve controlled the flow of electricity by attracting or repelling electrons and could work far more delicately and rapidly than any mechanical switch. Devices making use of such control of electron flow are "electronic" in nature.

In 1907 the American inventor Lee De Forest carried electronic control a step farther. He inserted a second plate between the filament and the original plate. This second plate was perforated with holes and was called a "grid."

The grid can have a positive charge imposed upon it. Being closer to the filament than the plate is, the grid's positive charge is particularly effective in sucking negatively charged electrons out of the filament and sending them on through its own holes to the plate, thus completing the circuit and keeping the current flowing. The grid can in this way cause a larger current to flow than would flow in its absence.

Furthermore, suppose the positive charge on the grid is made to waver in amount. When the positive charge on the grid rises even slightly, the electrons come out of the filament in considerably greater quantity; if it falls even slightly, the electrons come out in considerably lesser quantity. A small rise or fall in the charge on the grid will impose a correspondingly large rise or fall in the current passing from filament to plate. Moreover, the pattern of rise and fall in the large current will exactly mimic the pattern of wavering of positive charge on the plate. The "valve" is now more than a valve; it is an "amplifier."

Amplifiers came to be commonly known as "radio tubes" in the United States. Radio waves can be converted into tiny electric currents that can be made to affect the grid. As the amplitude of the radio waves rises and falls in a fashion that matches the sound waves imposed upon it, the grid's positive charge rises and falls in exact correspondence. The radio-wave energy is low, and the fluctuation of charge on the grid is tiny. However, the fluctuating charge on the grid controls a much larger current passing through the evacuated bulb. It was this electronic control that was the cornerstone of radio technology before 1947. However, it was not only in radios that radio tubes were useful. They were all that served (prior to December 23, 1947) to make any electronic device practical—record players, public address systems, and so on.

It seems rather ungrateful to com-

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

The largest element in this photograph is a vacuum tube, the precursor of the transistor. The three-pronged element is a transistor produced in 1959. This mid-period transistor is resting on a silicon wafer, the apex of transistor technology. It is two inches in diameter and contains 20,000 transistors etched on its surface.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

plain of the radio tube when its services to technology have been so enormous, but it did have certain disadvantages that we can see particularly clearly in retrospect. Each radio tube had to be fairly large, since enough vacuum had to be enclosed for filament, grid, and plate to be far enough apart so that electrons wouldn't jump the gap until encouraged to do so. This made radio tubes relatively expensive, since they had to be manufactured out of considerable amounts of material. Furthermore, since radio tubes were large, any device using them had to be bulky. Then, too, as devices grew more sophisticated, more and more tubes (each designed to fulfill a special purpose) were required, and bulkiness became more pronounced. Early computers that made use of thousands of radio tubes were simply enormous.

And there were other difficulties. Since glass is brittle, radio tubes were fragile. They were also short-lived, because even the tiniest leak eventually ruined the vacuum and filaments tended to evaporate and break when under constant and repeated high temperatures. They were energy consuming, because the tubes would not work unless the filament was maintained at a temperature high enough to cause it to emit electrons. Finally, they were time consuming, because the tube would not start to work until the filament was warmed up to the necessary high temperature. (Anyone past the first flush of youth remembers the irritating "warm-up" time that elapsed after the switch-on before the radio started emitting sound—and the frequency with which a repairman had to replace this tube or that.)

The correction of every single one of the deficiencies of the radio tube came about because in the 1940s scientists at the Bell Telephone Laboratories grew interested in such substances as silicon and germanium. Silicon and germanium are elements that have some of the properties we associate with metals. In particular, they can conduct electricity—not nearly as well as metals, to be sure, but far better than such typical insulators as glass, silk, and rubber. As a result, silicon and germanium are called "semiconductors."

It was this semiconducting property that caught the eye of the Bell Labs scientists, particularly since it seemed to depend very strongly on the nature and quantity of the impurities in the substance rather than on the substance itself. Absolutely pure germanium, for instance (and whatever I say henceforth about germanium applies to silicon, too), does not carry current at all well and would not, in itself, be considered a semiconductor.

To see this, consider that each germanium atom has four outer electrons, at least some of which would have to move, somehow, if germanium were to conduct a current. However, each germanium atom will share each one of its four outer electrons with a neighboring germanium atom. The result is that in a germanium crystal (where germanium atoms are arranged in a regular pattern) every germanium atom is surrounded by four other germanium atoms. Between each pair of neighboring germanium atoms is a pair of electrons, one contributed by each of the neighbors. Around any individual germanium atom, then, are eight electrons, four of which are its own and four of which are contributed, one each, by the four neighbors. All this makes for a very stable arrangement. It takes a great deal of energy to make the electrons move, and while they are motionless, pure germanium will not conduct a current at all well.

But suppose a tiny bit of arsenic is added to the germanium crystal and is distributed evenly throughout. Every once in a long interval an arsenic atom will be found in place of a germanium atom somewhere in the crystal. And, as it happens, each arsenic atom has, not four, but *five* outer electrons.

Four of the outer electrons of the arsenic atom can play the role of germanium's four outer electrons. The arsenic atom, too, will be surrounded by eight electrons, four of its own and one from each of its four neighbors. However, this leaves the fifth arsenic electron homeless. The eight electrons around each atom, whether arsenic or germanium, fill the available space. The fifth electron of each arsenic atom thus can move about easily, being held nowhere.

In the case of any electric current the negatively charged electrons are repelled from the negative end of the circuit (the negative electrode) and are attracted toward the positive end of the circuit (the positive electrode). If an arsenic-containing germanium crystal is made part of the electric circuit, those loose fifth electrons will move away from the negative electrode and toward the positive electrode. Current then flows through the germanium crystal easily enough to make it a semiconductor.

But suppose that, rather than arsenic, a trace of boron is added to the original pure germanium crystal. In this case, at intervals in the germanium crystal, there will be a boron atom instead of a germanium atom—and the boron atom has only *three* outer electrons.

The boron atom in the germanium crystal therefore is surrounded by only seven electrons, three of its own and one each from its four neighbors. There is room for eight electrons surrounding the atom, and the place where the eighth electron ought to be remains unfilled. It represents a "hole" in the electron pattern.

Imagine such a germanium crystal made part of an electric circuit. Under the push of the electric current there is a tendency for the electrons to move toward the positive electrode. However, most of the electrons can't respond. Not only are they held tightly in the eight-electron pattern, but even if one moved, there would be no place for it to move to, since all the places where an electron might go are already filled.

The exception occurs when an electron happens to be adjacent to the hole around one of the boron atoms. An electron from the negative-electrode side of the hole, moving toward the positive electrode, could slip into the hole. Now there is a new hole where the electron that moved used to be.

The new hole is slightly nearer the negative electrode. Another electron slips into it, and the hole is displaced to a position still nearer to the negative electrode. In a steady ticking, electrons sidle toward the positive electrode, each one moving into a hole, while the holes themselves move steadily toward the negative electrode.

The holes in the boron-containing germanium crystals behave like positively charged particles, moving in the opposite direction to that in which the electrons move. The holes move toward the negative electrode in the same way and at the same speed that electrons move toward the positive electrode. The boron-containing germanium crystal will conduct an electric current exactly as an arsenic-containing germanium crystal will. Both are semiconductors.

So there are two types of semiconducting germanium crystals. There is the "n-type" (for "negative"), in which there are negatively charged electrons moving toward the positive electrode; and there is the "p-type" (for "positive"), in which there are holes, behaving as though they were positively charged particles, moving toward the negative electrode.

Suppose that these two types of semiconductors are used in combination—for example, a germanium crystal containing a trace of arsenic on one side and a trace of boron on the other: the first end n-type and the other p-type. Suppose also that such a germanium crystal is made part of a circuit in which the negative electrode is attached to the n-type end and the positive electrode to the p-type end.

The loose electrons in the n-type end migrate out of that end and move across the p-type end toward the positive electrode. The holes in the p-type end migrate out of that end and move across the n-type end to the negative

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

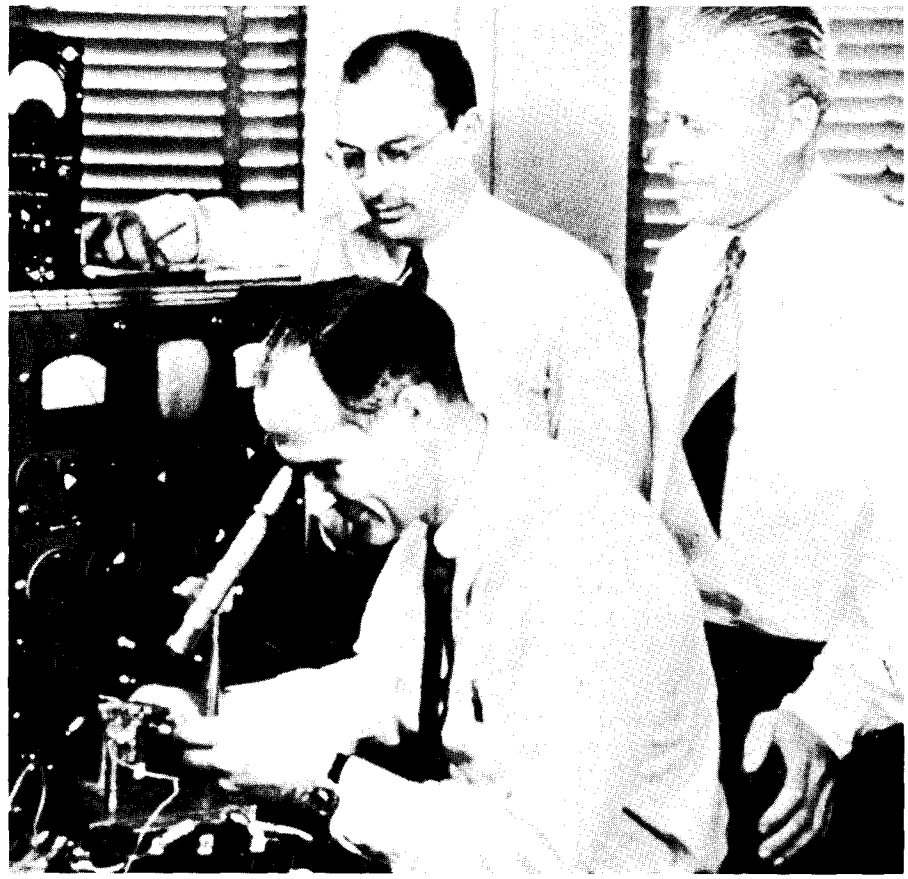
electrode. Neither the electrons nor the holes get used up. From the negative electrode more electrons enter the n-type end. Electrons from the p-type end leave the crystal as they move toward the positive electrode, leaving more holes behind. The net result is that when the circuit is hooked up in this fashion, electric current flows across the germanium crystal.

But suppose the electric circuit is hooked up in reverse, with the positive electrode attached to the n-type end and the negative electrode to the p-type end. Now the electrons in the n-type end are attracted toward the positive electrode in their immediate neighborhood and pull away from the center of the crystal. The holes in the p-type end are attracted to the negative electrode in their immediate neighborhood and also pull away from the center of the crystal. The center of the crystal is left with neither excess electrons nor holes but with atoms each surrounded by an even eight electrons. Such eight-electron atoms are nonconductors, and there is *no* electric current through the crystal under such conditions.

But what if an alternating current is attached to the two sides of the crystal? In that case each side is attached to a negative electrode, then a positive electrode, back to a negative, then positive again, in rapid alteration. Whenever the negative electrode is at the n-type end and the positive electrode is at the p-type end, the current flows across the crystal; whenever the arrangement is reversed, it does not flow. Despite the fact that such a crystal is attached to an alternating current source, only a direct current gets through. The crystal thus acts as a rectifier—just as Fleming's valve does—with the n-type end and p-type end acting as filament and plate respectively. Whereas Fleming's valve works because of the vacuum it contains, the crystal is a solid object from end to end. A germanium crystal that does the work of a vacuum tube is therefore called a "solid-state" device.

It is possible to prepare a particularly useful solid-state device for using a germanium crystal in which both ends are n-type with a thin p-type center separating them. The p-type center acts as the grid does in a radio tube. If a varying current source is attached to the p-type center, it can control a similar and much larger current passing through the crystal. The crystal then acts as an amplifier.

The men at Bell Laboratories who developed this solid-state amplifier, completing the task on December 23, 1947, were William Bradford Shockley, Walter Houser Brattain, and John Bardeen. Their coworker, John Robinson Pierce, suggested that such amplifying crystals be called "transistors" because they *trans*ferred an electrical signal over what would ordinarily be a res*istor*.



The inventors of the transistor—Walter Brattain (seated), John Bardeen (left), and William Shockley (right)—received the Nobel Prize for physics in 1956.

The transistor, in doing the work of a radio tube, corrected every one of the latter's disadvantages. In the first place, the transistor requires no vacuum to insulate the various elements of its structure from each other; portions of the crystal themselves can act as insulators. At once this property wiped out the need for expensive vacuum technology or for fragile glass enclosures.

The crystals are far more effective as insulators than a vacuum is, so the elements of the transistor can be separated by microscopic distances and still be insulated. The transistor can therefore be tiny in size—and cheap.

The transistor works at room temperature; thus, no warm-up period is necessary. Since nothing has to be heated and kept hot, there is no large energy consumption. Since there is no delicate filament to evaporate and break under continuing use, the transistor is far more rugged and can last far longer than a vacuum tube.

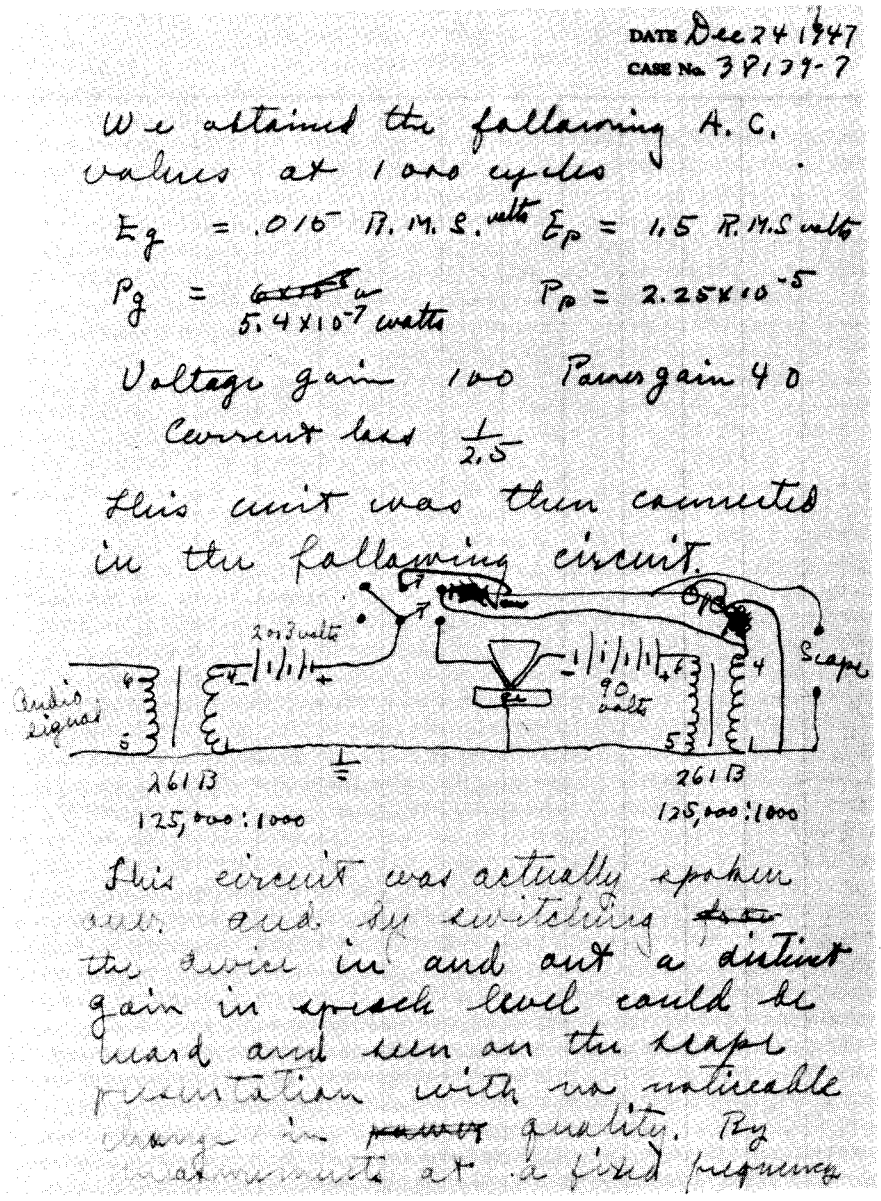
To be sure, the transistor did have one disadvantage to begin with. In order for it to work, it had to be composed of a very pure material to which just the right amount of specific impurities were added. If an impurity were present in slightly too great or too small an amount or if the wrong impurities were inadvertently present, the transistor would not work properly.

Efforts were made to devise techniques for purification that would meet the need. In 1952, for instance, the technique of zone refining was introduced by William G. Pfann of Bell Labs. Here the end of a rod of, let us say, germanium is placed in the hollow of a doughnut-shaped heating element. The end of the germanium is heated until it softens, and the crystal is then slowly moved through the doughnut hollow so that the softened portion progresses along the length of the rod. The impurities in the rod tend to remain in the softened zone and are literally washed to the other end of the rod. After a few passes of this sort the other end of the rod is cut off, and what is left of the germanium rod is unprecedentedly pure.

By the middle 1950s, thanks to refinements like this, the transistor had become a thoroughly reliable device, and there were the beginnings of mass production. The clearly apparent usefulness of the device led to a Nobel Prize in physics for Shockley, Brattain, and Bardeen in 1956.

Of all the advantages of the transistor the most important was its small

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



DATE Dec 24 1947
CASE No 39179-7

We attained the following A. C. values at 1000 cycles

E_g = .010 R. M. S. volts E_p = 1.5 R.M.S volts

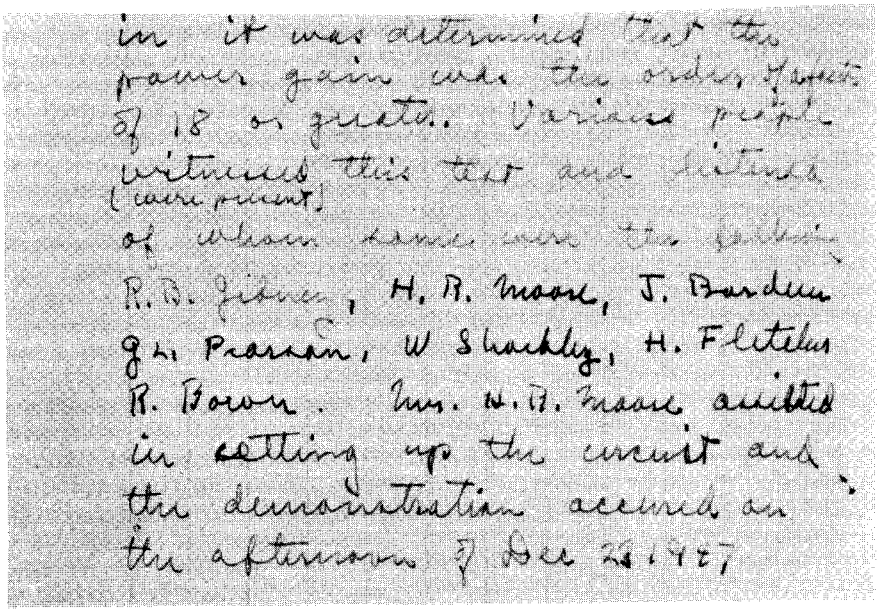
P_g = ~~6x10⁻⁸~~ 5.4×10^{-7} watts $P_p = 2.25 \times 10^{-5}$

Voltage gain 100 Power gain 40

Current loss $\frac{1}{2.5}$

This unit was then connected in the following circuit.

This circuit was actually spoken over. And by switching the device in and out a distinct gain in speech level could be heard and seen on the scope presentation with no noticeable change in ~~power~~ quality. By measurements at a fixed frequency



in it was determined that the power gain was the order of 18 or greater. Various people witnessed this test and initialed (current present), of whom names were the following R. B. Gibney, H. R. Moore, J. Bardeen, G. L. Pearson, W. Shockley, H. Fletcher, R. Bowen. Mrs. W. H. Brattain assisted in setting up the circuit and the demonstration occurred on the afternoon of Dec 23, 1947

The laboratory notebook entry of Walter Brattain records the events of December 23, 1947, when the transistor effect was discovered at Bell Labs.

size. As early as 1953, transistorized hearing aids were small enough to be fitted into the earpieces of spectacles and plugged into the ear canal. It was one of the first examples of what the transistor would mean to the cause of "miniaturization."

The bulky piece of furniture we called a radio (on four legs and almost large enough to serve as a china closet) became, thanks to the transistor, a small box we could slip into our pocket and run on the energy output of tiny batteries. A pacemaker, producing accurately timed electrical pulses of fixed tininess, could become small enough and reliable enough to be implanted into the failing hearts of thousands, helping to keep them in normal health. There are computers that, if they depended on mechanical gears alone, would fill the Pentagon and take years to answer the complicated questions we are now accustomed to asking. With radio tubes they would fill a large room and take minutes to answer. Transistorized, they stand in the corner and answer in fractions of a second. And those simpler calculating devices that used to sit on desk tops are now small slabs that fit easily into the palm of the hand.

Without the transistor there would be no space age. The small satellites we send out into space could do very little in the way of observing, recording, and sending back information were it not that tiny devices (tiny enough only by grace of transistors) could be packed into them. Without the transistor the necessary complexities required to design and build a rocket ship capable of sending men to the moon and bringing them back alive —the calculations required to predict and control ignition, thrust, and trajectory, for example—would demand computers too large, too slow, and too expensive to be practical.

And miniaturization continues. A crystal chip the size of a postage stamp can be filled with thousands of circuit elements, each so small as to be scarcely visible to the naked eye. All of modern technology now depends upon these chips of semiconducting crystals. Without them scarcely a communicating device would work. Airplanes would be grounded. Our sophisticated war machine would grind to a helpless halt. The work of government and business would be thrown into absolute confusion.

It is hard to realize that we are now celebrating only the silver anniversary of the birth of the transistor. It is harder to realize that the revolution it has brought about has become so extensive and intensive in a mere twenty-five years, and it is hardest of all to believe that it has passed over our heads so quietly. □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Guessing and Knowing

Reflections on the Science and Technology of Medicine

BY LEWIS THOMAS

The technology of medicine has certain peculiar features that differentiate this field from all the rest. One difference has to do with the economics that seems to govern all other technological advances but has no discernible influence on the kinds of things we do, or *think* we do, in medicine. For example, engineers do not build new bridges at great cost without knowing in advance, quite precisely, what the transport requirements will be in the future and having some kind of assurance that the bridges will bear the traffic, meet all foreseeable demands, and stand up to all foreseeable stresses. But we will undertake the development of an artificial heart, at the cost of many bridges, without going through any sort of cost-benefit, logistic, or even moral analysis of what it is that we are making. Indeed, in medicine it is characteristic of our technology that we never count the cost, even when the bills begin coming in.

This is plainly a defect in our system—if we can be said to have a system. It is in part explainable by our history, by the brand-newness of any kind of technology at all in this field, and by our consequent unfamiliarity with any methods, or, indeed, any incentive in the first place, for technology assessment in medicine. We have had almost no genuine science to tap into for our technology until just the past three decades. As a profession, we go back a very much longer stretch of time, probably thousands of years. During most of our history, therefore, we have been accustomed to no technology at all or to pseudotechnologies without science. We acquired the habit long since of improvising, of trying whatever came to hand, and in this way we have gone through our cyclical fads and fashions, generation after generation, ranging from bleeding, cupping, and purging, through incantations and the reading of omens, to prefrontal lobotomy and Metrazol convulsions, and we have all gotten quite used to this kind of thing, whether we will admit it or not. Early on we became accustomed to the demand that a doctor must *do* something; doctors who didn't *do* something, no matter what, were not real doctors, just as shamans were not real shamans until they turned on the good spirits and turned off the bad ones. During the long period when we knew of nothing to do about typhoid fever except to stand by and wait for the patient to struggle through while we kept an eye out for the hemorrhages and perforations that might kill him at any time, the highest level of technology was the turpentine stupe—an elaborate kind of fomentation applied to the belly, very difficult to make without ending up with a messy shambles and capable, I believe, of doing absolutely no good whatever beyond making everyone feel that the doctor was *doing* something. This, by the way, is not a baroque item from our distant history. I learned to make a turpentine stupe at the Peter Bent Brigham Hospital in 1937; it is, in my view, a relatively recent, almost modern example of the way we develop technology, and it is not yet all behind us, as we shall see. We still have our equivalents of bleeding and cupping and turpentine stupes, and they are all around us.

The trouble with this kind of pseudotechnology is that it has become unbelievably expensive in its more modern forms, and at times it is dangerous. It is particularly dangerous and expensive when it takes the form of strong drugs or bizarre diets or surgery, which it sometimes does.

We may be in danger of forgetting the real reason why we have always done such things in the first place. Why, when we do not understand even faintly the underlying nature of a fatal disease and can do nothing about it to change its course, do we feel an obligation to *do* something—and why does society expect us to try? The answer, of course, is that we must; it is in our nature to try. The best definition ever given of a physician's occupation is the old one: "to cure sometimes, to relieve often, to comfort *always*." It is that word "always" that is operative. And one of the best ways to comfort is to keep trying, no matter what.

But now that science has entered medicine in full force, we must begin to sort out our affairs. From now on we will need, as never before, to keep these central enterprises—"to cure, to relieve, to comfort"—clearly separated from each other in our minds. They do not really overlap, but we tend to view them—and the public, of course, takes the same view—as though they were all of a piece, all the same body of technology, all derived from science, all modern. I think perhaps one reason we do this is because of an unconscious conviction that dollar values must be placed on all human enterprises; we do not like to confess to ourselves that so many of the things that we do are provided simply for comfort and reassurance. Somehow, these have come to seem less significant products than a cure; so we try, consciously or unconsciously, to pretend that there is more continuity than is really there, that everything we do is directed toward the same end.

In fact, in real life we are engaged in three, maybe four, entirely different kinds of technology in medicine. I have an idea that if we could conduct a sort of technology assessment on ourselves and come to some sort of general agreement about which technology belongs in which category, we might be in a better position to make intelligent plans and forecasts for the future, and we would almost surely be clearer in our minds about how to set priorities for the investment of scientific resources for the future.

Before beginning my own version of a classification, I would like to make a general declaration of faith and a general confession of optimism. My dogmas are as follows: I do not believe, first of all, in the inevitability of disease; I concede the inevitability of the *risk* of disease, but I cannot imagine any category of human disease that we are precluded by nature from thinking our way around. Moreover, I do not believe that when we succeed in controlling or curing one kind of disease, we will necessarily, automatically, find that it has been replaced by another.

Even if I am wrong about this and it should turn out that there is some law of nature that mandates the doling out of new diseases up to some optimal number whenever old ones disappear (which strikes me as a piece of illogic as well as high improbability), I still cannot imagine remaining helpless before all the new ones. Nature is inventive, I grant, but not so inventive as to continue elaborating endless successions of brand-new, impenetrable disease mechanisms. After we have learned enough to be able to penetrate and control the mechanisms of today's diseases, I believe we will automatically be well equipped to deal with whatever new ones turn up. I do not say this in any arrogance; it just seems to me reasonable.

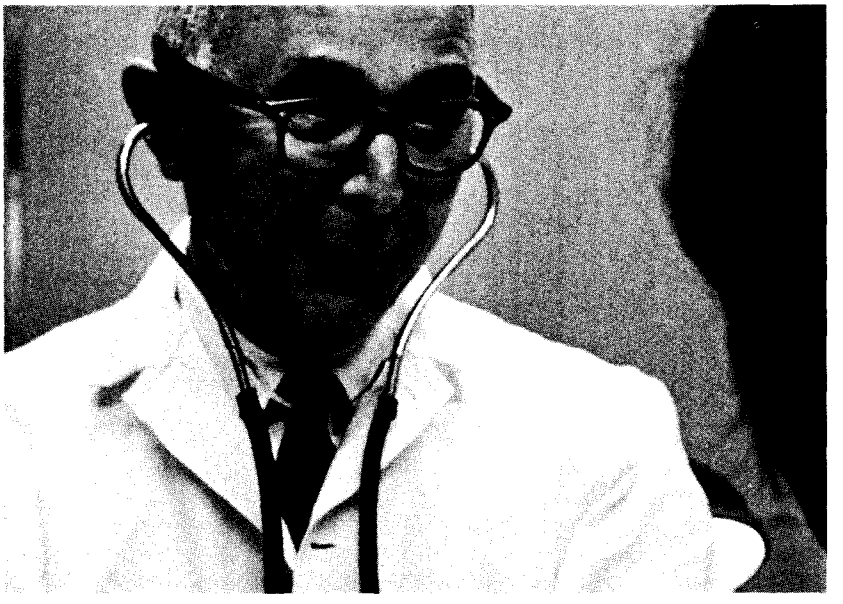
I have no more difficulty in imagining a disease-free human society, or at least a society in which major diseases are held under control, than I do with the idea that valuable stocks of animals or varieties of plants can be maintained *relatively* free of disease.

I believe that disease is fundamentally unnatural. It is not, in my view,

---

Dr. Lewis Thomas is dean of the Yale University School of Medicine. This article is adapted from a paper he delivered last month at the Institute of Medicine of the National Academy of Sciences.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED



Somehow, giving a patient reassurance has come to be a less significant product than curing him.

a normal or natural part of the human condition for aging human beings to become paralyzed and idiotic for long years before they finally die any more than it is normal for young people to develop acute leukemia. I believe that disease generally results from biological mistakes, misinterpretations of signals on the part of cells and tissues, and misuse of information. I believe that there is a general tendency, amounting to a kind of universal natural force, for living things to attempt to join together, to pool resources, to establish symbiotic relationships. Parasitism is what happens when this fundamental drive forces partnerships upon inappropriate, wildly asymmetric partners. In order to protect against such collisions, we are all provided with chemical signals of identity, by which the life of the earth is regulated and kept balanced. Certain major varieties of disease are due to the panic produced by such signals; for example, most mammals, and even certain invertebrates, such as limulus, read the signal of the lipopolysaccharide endotoxin extracted from Gram-negative bacteria as the news of absolute doom, and so violent an inflammatory reaction is set up inside the whole vascular compartment that the circulation of the blood is brought to a standstill. This happens, not because of any intrinsic, poisonous properties of endotoxin, but because of the way the information contained in its molecule happens to be read by an animal host. In my view, much of human disease works in this way, and the mechanisms involved are, I believe, quite open to intelligent intervention and reversal whenever we learn more about how they operate.

To say it another way, I do not consider that the ambition to control or eliminate disease, which is an ambition shared by everyone in biomedical science, is either unthinkable or any distance beyond imagining. What makes it seem to many people like an outlandish, even outrageous way to be talking is that it becomes assumed that we are talking about human happiness, which is really quite another matter, or about human mortality, which is also quite another matter. As for the first, it is, of course, true that disease has long been a major cause of human despair and wretchedness, but this is no reason to believe that we will all become happy, well-adjusted people by being rid of it. We will still be left with an abundance of worrisome problems, and we will still have ample reasons for despair, and no medical science —not even psychiatry—has any foreseeable contribution to make in these matters. War and bombs, failure and anomie, clouding of the sun by particles of our own waste, the shutting off of oxygen, the loss of room to move around in—these are problems that will still be with us, healthy or ailing, for some time to come, and I hope that no one will suggest that these are in any sense problems for medicine—or we will never get any of them solved. But perhaps human society will be better equipped to think its way through these imponderables if, at least, we no longer have today's roster of diseases to worry us at the same time.

As for mortality, I have a hunch that we will discover someday that disease and death are not as inextricably interrelated as we tend to view them today. All the rest of nature undergoes, in its variable cycles, the physiological process of death by the clock; all creatures, all plants, age finally, and at the end they all die. Diploid cells in tissue culture have finite life spans, which are different for different lines of cells and characteristic of particular cell stocks. Some live for forty generations and then die, others for seventy. They do not develop fatal diseases. It is not a catastrophe; they simply reach the end of a life-span programed for them in their own genomes, and at the end of that span they die.

I believe that we are also like this. If we are not struck down prematurely by one or another of today's diseases, we live a certain length of time and then we die, and I doubt that medicine will ever gain a capacity to do anything much to modify this. I can see no reason for trying and no hope of success anyway. At a certain age it is in our nature to wear out, to come unhinged, and to die, and that is that. My point here is that I very much doubt that the age at which this happens will be very drastically changed for most of us when we have learned more about how to control disease. The main difference will be that many of us will die in relatively good health, in a manner of speaking—rather after the fashion of Bertrand Russell—or we may simply dry up and blow away.

And even if our technology were to become so dazzlingly effective as to rid us of all the major diseases that now kill many of us off before our time of wearing out, I doubt that the increase in population caused by this would make more than a marginal difference to the general problem of world overpopulation. Indeed, it might help some, since there would be smaller numbers of us in hospitals or living out our lives in various degrees of incapacitation and suffering. Overpopulation is bad enough, as social problems go, but to be overpopulated with so many of us disabled by disease, especially by the chronic diseases of the elderly, let alone schizophrenia, presents an unthinkable prospect for the approaching century.

In any case, we do not really owe much of today's population problem to the technology of medicine. Overpopulation has been coming on for several centuries, and the alarming upward slope began long before we had developed a genuine capacity to change the outcome of disease. Modern medical science arrived only recently, when the world population had al-

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

ready been set on what seems to be its irreversible course by the civilizing technologies of agriculture, engineering, and sanitation—most especially the latter. From here on, the potential benefits of medicine greatly outweigh any conceivable hazard; we will perhaps change slightly the numbers of us living at any moment in time, but it lies within our capacity to change very greatly the quality of life.

Well, where do we stand today as a science? This is not the same question, of course, as the one concerning the state of our technology. Our science is the science of the biological revolution, and we have scarcely begun to apply any of it. We do not yet, in fact, know where to begin. In contrast with today's genuinely high technologies of biology or neurobiology or cellular biology, with the immense power of their instruments for exploring the most fundamental questions about the processes of life, the condition of our knowledge of disease mechanisms has a primitive, nineteenth-century look, and our capacity to intervene in disease is not much better. This is the general shape of things today, but tomorrow will be very different indeed. I simply cannot imagine any long persistence of our ignorance about disease mechanisms in the face of all that is being learned about normal cells and tissues. Our time for the application of science on a major scale is approaching rapidly, and medicine will be totally transformed when it happens. The hard problem just ahead will be for us to set priorities and make choices between options. We will be obliged, as never before in our history, to select between alternative possibilities in technology; we will be compelled to make long-range predictions as to the outcome of this course or that; in short, we will be thrust into the business of technology assessment, just like all the other great national enterprises.

It is a curious position that we are in today, poised as we are between the old world of trial-and-error empiricism, superstition, hunch, and resignation to defeat and the new world just ahead of hard information and applied science. We seem to work, as of now, with three different levels of technology.

First, and necessarily foremost, is what might be termed the *high technology* of medicine, equivalent in its sophistication and effectiveness to the high technologies of the physical sciences. It is a curious fact that although the accomplishments here represent the major triumphs of medicine to date, most of us tend to take them for granted, and we often forget what they mean for the quality of life in modern society. This is the genuinely decisive technology of modern medicine, exemplified best by methods for immunization against diphtheria, pertussis, and various virus diseases and the contemporary use of antibiotics and chemotherapy for bacterial infections. The capacity to deal effectively with syphilis and tuberculosis represents a milestone in human endeavor, even though full use of this potential has not yet been made. And there are, of course, other examples: the treatment of endocrinologic disorders with appropriate hormones, the prevention of hemolytic disease of the newborn, the treatment and prevention of various nutritional disorders, and perhaps just around the corner the management of Parkinsonism and sickle-cell anemia. There are other examples, and everyone will have his favorite candidates for the list, but the truth is that there are not nearly as many as the public has been led to believe.

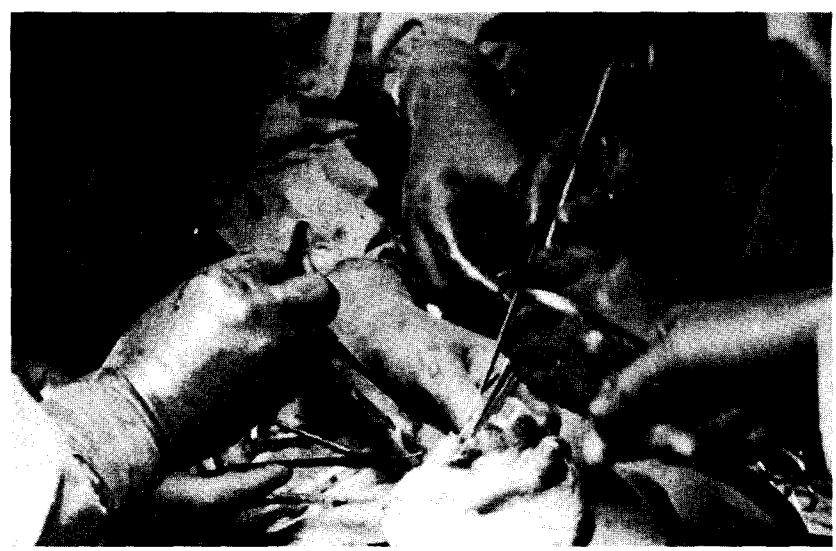
The point to be made about this kind of technology — the real high technology of medicine—is that it comes as the result of a genuine understanding of disease mechanisms, and when it becomes available, it is relatively inexpensive, relatively simple, and relatively easy to deliver.

Offhand I cannot think of any important human disease that medicine possesses the capacity to prevent or cure outright in which the cost of the technology is itself a major problem. The price is never as high as the cost of managing the same disease was during the earlier stages of ineffective technology. If a case of typhoid fever had to be managed today by the best methods of 1935, it would run to a staggering expense. After, say, about fifty days of hospitalization, requiring the most demanding kind of nursing care, with the obsessive concern for details of diet that characterized the therapy of the time, with daily laboratory monitoring and, on occasion, surgical intervention for abdominal catastrophe, I should think $10,000 would be a conservative estimate for the illness, as contrasted with today's cost of a bottle of Chloramphenicol and a day or two of fever. The kind of technology that was evolving for poliomyelitis in the early 1950s, just before the emergence of the basic research that made the vaccine possible, provides another illustration of the point. It is the cost of those kinds of technology and their relative effectiveness that must be compared with the cost and effectiveness of the vaccine.

Pulmonary tuberculosis had similar episodes in its history. There was a sudden enthusiasm for the surgical removal of infected lung tissue in the early 1950s, and elaborate plans were being made for new and expensive installations for major pulmonary surgery in tuberculosis hospitals. Then the drug Isoniazid and the antibiotic streptomycin came along and the hospitals themselves were closed up.

It is when physicians are bogged down by their incomplete technologies, by the innumerable things they are obliged to do in medicine when they lack a clear understanding of disease mechanisms, that the deficiencies of the health-care system are most conspicuous.

Organ transplantation is an outstanding example of a halfway technology, designed in part as a substitute for cures that don't yet exist.



PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

This brings me to the second level of technology in this classification, which I have termed the "halfway technology" of medicine. This represents the kinds of things that must be done after the fact, in an effort to compensate for the incapacitating effects of certain diseases whose courses we are unable to do very much about. It is a technology designed to make up for disease or to postpone death.

The outstanding examples in recent years are the transplantations of hearts, kidneys, livers, and other organs and the equally spectacular inventions of artificial organs. In the public mind this kind of technology has come to seem like the equivalent of the high technologies of the physical sciences. The media tend to present each new procedure as a breakthrough and a therapeutic triumph, instead of the makeshift procedure that it really is.

In fact, this level of technology is by its nature highly sophisticated and at the same time profoundly primitive. It is the kind of thing that we must continue to do until there is a genuine understanding of the mechanisms involved in disease. In chronic glomerulonephritis, for example, a much clearer insight will be needed into the events leading to the destruction of capillaries in the kidney. There is solid evidence that abnormal immunologic reactions are the basis for this destruction. If more information can be obtained, it should become possible to intervene intelligently, to prevent the process or turn it around. When this level of understanding has been reached, the technology of kidney replacement will not be much needed and should no longer pose the huge problems of logistics, cost, and ethics that it poses today.

An extremely complex and costly technology for the management of coronary heart disease has evolved, involving specialized ambulances and hospital units, all kinds of electronic gadgetry, and whole platoons of new professional personnel to deal with the end results of coronary thrombosis. Almost everything offered today for the treatment of heart disease is at this level of technology, with the transplanted and artificial hearts as ultimate examples. When enough has been learned for us to know what really goes wrong in heart disease, we ought to be in a position to figure out ways to prevent or reverse the process; and when this happens, the current elaborate technology will be set to one side.

The impending development of an artificial heart illustrates the kind of dilemma we are placed in by today's emphasis on halfway technology. Let us assume that heart disease, for all its manifold origins and its complexity, does represent an approachable scientific

KAHLÚA® Splash. What a fresh idea.

The cocktail's been given a new twist. With an ounce of Kahlúa, a splash of soda, and a squeeze of lime. On the rocks. A drink to have any time good taste is in order.

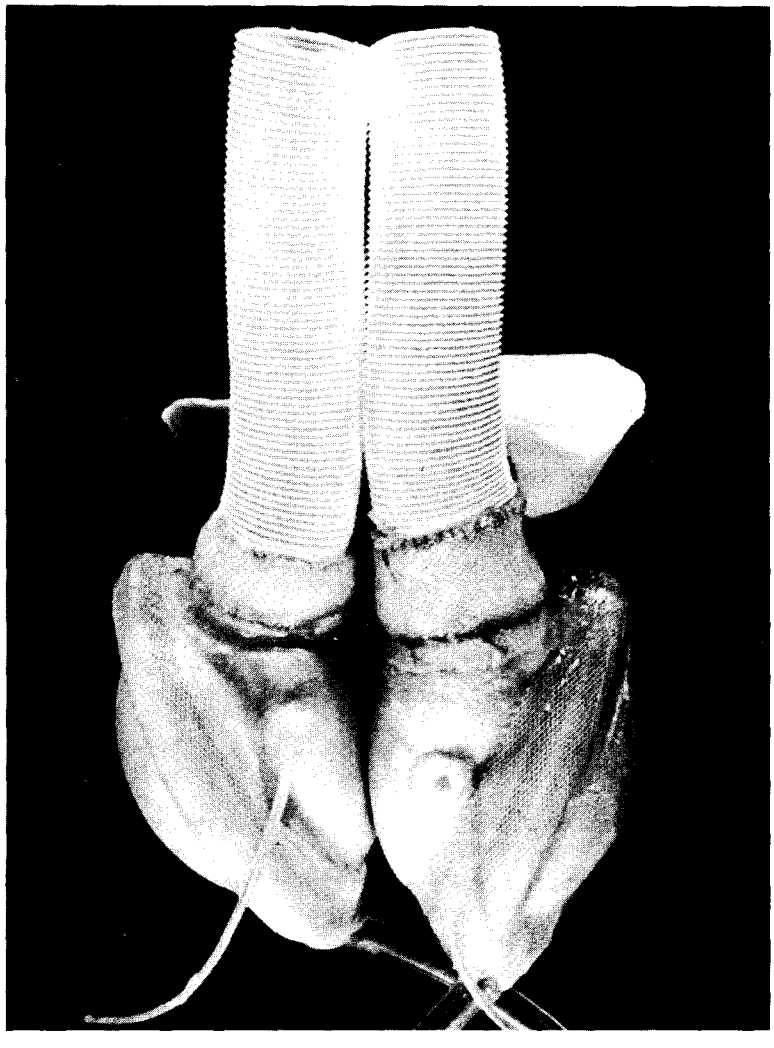
It's so easy to get fresh with Kahlúa. We tell all in our recipe book. Yours for the sending. Because you deserve something nice.

Kahlúa. Coffee Liqueur from Sunny Mexico. 53 Proof.
Jules Berman & Assoc., 116 No. Robertson Blvd., Los Angeles, Calif. 90048

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

problem—that if we study the matter with sufficient imagination and energy, making use of all the new information about muscle structure and function and blood coagulation and lipid metabolism and making capital use of new information along other lines as yet unguessed at by any of us, we will eventually solve this problem, and we will then learn how to intervene before the onset of irreversible muscle or valve disease, to prevent the process or to turn it around. As a noncardiologist, an outsider, I have total confidence that this can be done, that sooner or later it will be done, and my colleagues who know a lot about heart disease have, I sense, this same kind of confidence for the long term. This, then, is one option and an altogether wise one to adopt. But the artificial heart represents a completely different, opposing attitude. To be willing to invest the hundreds of millions of dollars that will probably be necessary for this one piece of new technology almost demands of its proponents the conviction that heart disease represents an unapproachable, insoluble biological problem. It tends, as I see it, to write off scientific research. It assumes that the best we will be able to do, within the next few decades anyway, is to wait until the underlying mechanisms of heart disease have had their free run, until the organ has been demolished, and then to put into the chest this nuclear-powered, plastic-and-metal, essentially hideous engine. I am convinced that this is the wrong way to go. Even if it works—which, I am afraid, is not at all unlikely—I cannot imagine how society will solve the problems of cost, distribution, and priority. Who will be entitled to buy and have installed these engines: those with enough wealth to pay for them? Those who strike the rest of us, or our committees, as potentially useful citizens? Once we have started on this endless line of insoluble problems, there may be no turning back. If there ever was an urgent, overwhelming important problem in biomedical science, it is with us now: someone simply *must* provide us quickly with a solution to the problem of coronary arteriosclerosis. If this can be done, the artificial heart will become overnight an interesting and ingenious contraption, something clever and decorative, with some of the charm of a Tiffany lamp—a sort of instant antique—but no longer a practical thing, and we will all be better off for this transformation. Otherwise, we are in for real trouble just ahead, and I'm not sure we have the collective intelligence in medicine to deal with it.

A solution to coronary artery disease will make the artificial heart a sort of instant antique overnight.



Much of what is done in the treatment of cancer, by surgery, irradiation, and chemotherapy, represents halfway technology in the sense that these measures are directed at the existence of already established cancer cells, not at the mechanisms by which cells become neoplastic. The policy problems that confront us now, with the nation's declared commitment to conquer cancer, are somewhat like those involved in the artificial-heart question. There will be, for a while anyway, a running argument between two opposing forces. There will be on one side those who believe that cancer is a still unsolved but eminently approachable scientific puzzle, requiring only enough good research by imaginative investigators on a broad enough biological base, and that, provided with enough financial support and enough time, we will, in one way or another, find ourselves home and dry. On the other side there will be those who believe themselves to be more practical men of the real world, who feel that we have already come about as great a distance toward understanding cancer as we are likely to come for some time and that we should give the highest priority to applying on a much larger scale what we know today about this disease—that with surgery, chemotherapy, and radiation we can now cure or palliate a considerable number of patients and that what we need at this time is more and better technology of essentially today's model. I do not know how this argument will come out, but I believe it to be an issue of crucial symbolic significance; whichever way it goes may possibly indicate the drift of biomedical science for the next decade. I only wish that we could find a more comfortable zone of middle ground between those who believe that everything remains to be learned about cancer and those who believe that we already know enough to cope with it by

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

today's approaches. Personally, I would prefer a middle ground, for I generally like a comfortable position, but I am afraid that I belong with the first group of extremists in this one—for, to be honest, I regard cancer as an entirely unsolved problem, wide open to research and soluble; and I regard the technology of today's forms of therapy as paradigms of halfway technology, directed at the end-results of the disease rather than at underlying mechanisms.

It is characteristic of this kind of technology that it costs an enormous amount of money and requires a continuing expansion of hospital facilities. There is no end to the need for new, highly trained people to run the enterprise. And there is really no way out of this at the present state of knowledge. If the installation of specialized coronary-care units results in the extension of life for even a few patients with coronary disease (and there is no question that this technology is effective in a few cases), it seems to me an inevitable fact of life that as many of them as can be built will be put together and as much money as can be found will be spent. I do not see that anyone has much choice in this. We are obliged by the very nature of our professional responsibility to adopt any new technology that will benefit patients with otherwise untreatable diseases, even when only a very small percentage will be benefited and even when the costs are very high. Neither we nor any other sector of society controls this aspect of our economy. We cannot, like other industries, withhold a technology from the market place because it costs too much money or benefits too small a percentage of patients; the only thing that can move medicine away from this level of technology is new information, and the only imaginable source of this information is research.

The best we can do when the economic or logistic problems associated with our technology verge on the insupportable or when the odds are too high against the success of our procedures is to try to improve the technology or to discover an altogether new technology as quickly as possible. Meanwhile, however, we must continue to employ the less-than-satisfactory ones.

The near-miraculous achievements of the antibiotic drugs in controlling or eliminating our most serious bacterial infections — such as typhoid or lobar pneumonia or epidemic meningitis—are useful indicators of the future direction of technology in medicine. They are, in fact, pieces of solid evidence that technology does work. But they should not be mistaken for symbols of the whole of medicine.

And this brings me to the third level of technology. This is the large body of what is best termed "nontechnology." It is, in effect, the substitute for technology that medicine has always been compelled to use when we are unable to alter either the natural course of disease or its eventual outcome. A great deal of money is spent on this. It is valued highly by the professionals as well as by the patients. It consists of what is sometimes called "supportive therapy." It tides patients over through diseases that are not, by and large, understood. It is absolutely indispensable. It is not, however, a technology in any real sense.

It includes the large part of any good doctor's time that is taken up with simply providing reassurance, explaining to patients who fear that they have contracted one or another lethal disease that they are, in fact, quite healthy.

It is what physicians used to be engaged in at the bedside of patients with diphtheria, meningitis, poliomyelitis, lobar pneumonia, and all the rest of the infectious diseases that have since come under control.

It is what physicians must now do for patients with intractable cancer, severe rheumatoid arthritis, multiple sclerosis, stroke, and advanced cirrhosis. One can think of at least twenty major diseases that require this kind of supportive medical care because of the absence of an effective technology. I would include in this category a large amount of what is called mental disease and most varieties of cancer.

The cost of this nontechnology is very high and getting higher all the time. It requires not only a great deal of time but also very hard effort and skill on the part of physicians; only the very best of doctors are good at coping with this kind of defeat. It also involves long periods of hospitalization, lots of nursing, lots of involvement of nonmedical professionals in and out of the hospital. It represents, in short, a substantial segment of today's expenditures for health. It is not as great a financial problem for the future as halfway technology, but between them nontechnology and halfway technology will sooner or later drive into bankruptcy any system of health care that we may devise.

If I were a policymaker, interested in saving money for health care over the long haul, I would regard it as an act of prudence to give high priority to a lot more basic research in biological science. This is the only way to get the full mileage that biology has to offer the science of medicine, even though it seems, as used to be said in the days when the phrase still had some meaning, like asking for the moon. □

WIT TWISTER NO. 303

Edited by ARTHUR SWAN

The object of the game is to complete the poem by thinking of one word whose letters, when rearranged will yield the appropriate word for each series of blanks. Each dash within a blank corresponds to a letter of the word.

Whilst, Autumn Wind, thou — — — — — — — sky and land,

The — — — — — — — of the leaves, before thy hand

Has made them — — — — — — in each flaming tree.

O sad — — — — — — —: that dancing they must fall

And lie like motley garb the — — — — — — — sold

To be the soldier's — — — — — — — when the pall

Of battle-smoke was mixed with frost and cold!

A.S.

Answer is on page

FRASER YOUNG LITERARY CRYPT NO. 1535

A cryptogram is writing in cipher. Every letter is part of a code that remains constant throughout the puzzle. Answer No. 1535 will be found in the next issue.

NXYH WGHXTK GY PRYH DXYYGE HWCH WCY DTXSQ XOU DTCBAVROOK.

YKUQAK P. WCTTGY

Help Your Post Office

to Give You

the Best Possible Service.

Mail Early in the Day!!

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

THE GROWING CLOUT OF THE SUBMARINE

BY DANIEL S. GREENBERG

We have [**deleted**] and we are fairly certain that we have an [**deleted**]. We have sonar developments in our attack submarines and in various stages of research and development which would permit an even greater edge for our [**deleted**].

—Rear Admiral R. Y. Kaufman, director, Strategic Submarine Division, U.S. Navy, from "sanitized" public transcript of testimony before House Armed Services Committee, March 1972.

The above is an appropriately censored and unilluminating entry point to the burgeoning and arcane realm of underseas weaponry, wherein:

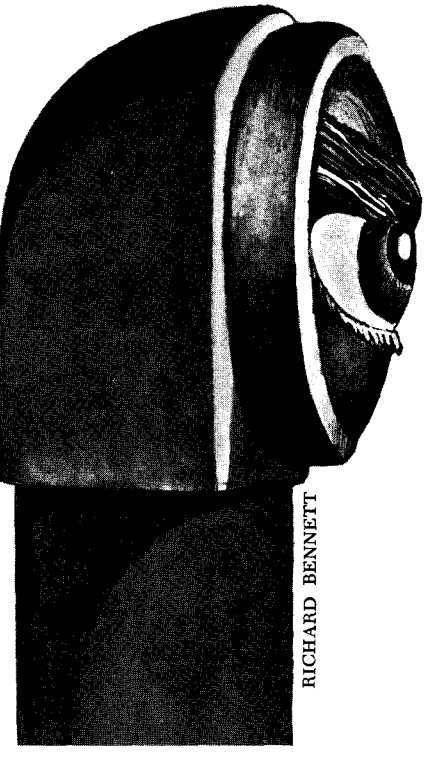
- ICBM-bearing Soviet and American nuclear-powered hunter-killer submarines play "tag" with one another, while U.S. microphones, moored to the ocean bottom, listen for the throb of hostile engines and feed signals into computerized tracking systems.
- Space scientists and engineers work with the highest priority—though apparently unsuccessfully so far—to use orbiting satellites to detect submerged nuclear-powered submarines from the "thermal wake" created by the enormous heat of their atomic propulsion systems. The object, desperately sought for and the centerpiece of strategic planning for this decade: "continuous tracking" and hence pin-point knowledge of the location of hostile missile-bearing submarines.
- U.S. Polaris submarines slip out of port and swiftly head for crowded shipping lanes, where they ride to the open sea beneath ordinary merchant vessels to evade detection by the Soviets' worldwide fleet of "fishing trawlers." Once free of possible surveillance, they scoot for deep water and remain submerged for sixty days.
- Antisubmarine researchers of both major powers, backed by research funds that probably total at least $1 billion a year, are hard at work on a variety of submarine-destroying systems. Among them is U.S. Project CAPTOR, which through 1971 had expended over $20 million on the development of an underwater-moored torpedo that, when activated, would automatically fire and home in on any passing submarine that failed to respond correctly to an acoustical challenge.
- Project SANGUINE is the designation for an urgent attempt to develop a system that will enable deep-submerged submarines to receive shore-based radio communications without moving close to the surface where they are easily detectable. Now they must unreel a clumsy antenna cable or surface a telltale aerial when they are submerged. From a Gargantuan underground grid of wires that the navy seeks to implant on a 3,000-square-mile reservation in northern Wisconsin, SANGUINE would propagate extremely low-frequency waves that can penetrate deep water. (Ironically, the venture is now enmeshed in technical uncertainties and legal barriers raised by environmentalists.)

These are merely a part of the great boom in underseas activity that has come about for one reason: nuclear deterrence—that I'll-certainly-kill-you-even-if-you-kill-me-first strategy that is the basis of East-West power relations—is moving beneath the waves. It is doing so because technological developments have put air-borne attack in the kamikaze category and will eventually make land-based missiles so vulnerable as to be unreliable for guaranteed retaliation. Radar, surface-to-air missiles, and fighter planes with homing missiles have doomed even supersonic aircraft as a sure means for delivering nuclear destruction, although, like cavalry *aficionados* of old, the aviators on both sides cling to the conveyance they know best. Land-based missiles, which now account for the bulk of U.S. and Soviet deterrent, are detectable from space satellites, making them "targetable" and therefore destructible—even more so now that in SALT I both sides have acknowledged the futility of anti-ballistic-missile systems and have agreed to limit their deployment to two sites each.

The SALT agreement, which further propels the deterrent into the oceans, was in line with the spirit of all U.S.–U.S.S.R. arms-control dealings, which dictates that when a technology or geographic region is found unsuitable for effective military use, it is relatively easy to agree not to use it. Hence, the 1959 pact not to militarize the Antarctic, the 1967 agreement prohibiting nuclear weapons on the moon, and the 1971 treaty against "emplacing or emplanting" nuclear weapons on the ocean floor.

The last-cited, however, said nothing about placing such weapons inside submarines that move between the floor and the surface, for the nuclear standoff requires a guarantee against a sneak punch, which is nicely provided by the ocean-roaming Polaris system, whose 2,500-mile A-3 missile can hit Moscow from any point within six million square miles of ocean. SALT, it should be noted, guarantees the United States its present number of forty-one missile-carrying submarines, along with the right to replace vessels with more modern craft. Under a provision that permits submarines under construction to be added to the fleet, it is expected that the Soviets will be adding sixteen to their operational fleet, which is now believed to number twenty-six.

For the United States the firepower of its underseas fleet is already under expansion with the conversion of thirty-one Polaris boats to the Poseidon system, which will permit each of the sixteen missiles aboard these vessels to carry at least three independently targetable warheads. And eventually the range, and thus the area of concealment, will be expanded to virtually all of the watery regions of the earth when the navy completes development of its



RICHARD BENNETT

Daniel S. Greenberg is Washington editor of SR/Science.

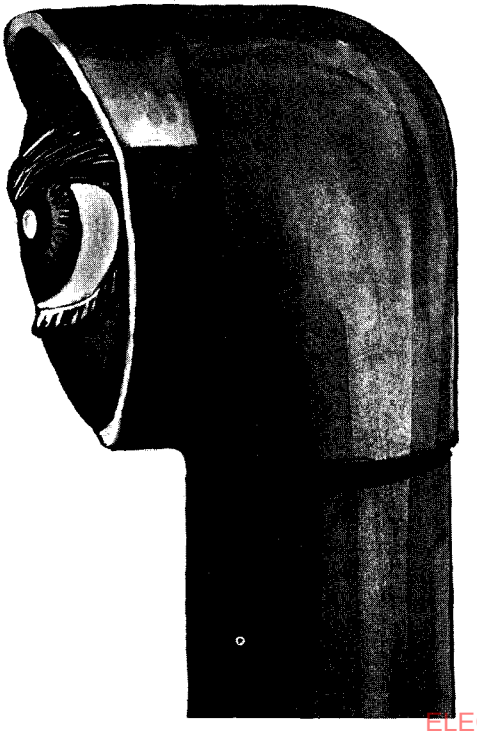
PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

long-planned Trident class of submarine—a billion-dollar, battleship-size craft, carrying twenty to twenty-four 6,000-mile-range missiles, each capable of spewing off perhaps as many as fourteen finely aimed warheads.

The tactic of easy East-West agreement on militarily unimportant matters is accompanied by a policy-making schizophrenia that oscillates between questing for technological superiority and seeking to avoid anything that might look threatening enough to cause the other side to start shooting.

Thus, one school of thought, not without influence in the Nixon administration, holds that the seaward movement of deterrence is a welcome development, since a missile force that can survive the enemy's worst and then shoot back is the best guarantee that the other side will not launch an attack. In the jargon of the arms controllers it is "stabilizing." Furthermore, sea-borne deterrence moves some prime targets—the missiles themselves—away from populated areas, and if a nuclear accident occurs, less damage is likely at sea than on land. The "stable deterrent" school, in fact, sees so much peacekeeping potential in submarine-based deterrence that one segment argues that antisubmarine warfare (ASW) tactics should not be further developed and that large ocean zones should be designated where the missile-carrying submarines of the United States and the U.S.S.R. could patrol without any attempt to detect them.

The other approach, which is in the ascendancy despite the SALT agreement, aims for improved methods of both concealing one's own submarines and finding and destroying those of the other side. And it is toward these twin goals that the navy acknowledges spending $766 million this fiscal year for construction and modernization of the underseas missile fleet, close to $600 million for ASW research, and perhaps another $2 billion for operation of ASW forces.



Despite these massive expenditures —and hints of even greater ones to come—it is generally acknowledged that the advantage still lies with the quarry, for the sea is essentially an opaque medium and the laws of physics are not on the side of the hunter. Variations in temperature, salinity, and depth as well as in underwater rock formations play incredible tricks with sound, which remains the best means of detection. At very deep levels sound travels true and fast; some years ago a 300-pound TNT charge detonated off Australia was detected by a navy listening post off Bermuda. But an anchored microphone can easily miss a stealthily moving submarine fifty kilometers away, and the problem is further compounded by the tactic of operating beneath well-traveled shipping lanes.

Since Soviet access to the open sea is bounded by relatively narrow straits, the surveillance problem for U.S. forces is somewhat simplified. Of the highest hush-hush nature is the question of whether the United States has constructed, or plans, an "acoustical barrier" to detect Soviet submarines slipping through the Straits of Gibraltar or between Great Britain and Greenland. If such a barrier exists or is in the works, there then arises the problem of whether it can be foiled by technical means or tactics—riding under an accompanying surface vessel, silent running, perhaps even drifting by; new hull materials that absorb rather than echo probing sound waves; or acoustical countermeasures that confuse the listening device. And then there is always the possibility of sending out a vessel to drop an explosive on the underwater listener.

The most lethal foe of a submarine is generally regarded to be another submarine, and it is known that the United States is currently operating some sixty killer submarines. It is these and their Soviet counterparts that, with virtually no public notice at all, routinely engage in the bizarre business of chasing their missile-bearing adversaries through the deep.

The navy, of course, is the most biased witness in deciding whether the underwater deterrent is essentially survivable, for as technology prescribes the eventual doom of the land-based, air force–operated ICBM force, the navy emerges as the service of the future.

But the navy is sparing no effort or expense to research every possibility that might lead to what it would like to find but fears that the Soviets might find: a technique for continuous tracking, which would place every missile-bearing submarine in the same cross hairs that now focus on their land-based counterparts.

Small hints of this quest come through now and then, as when Robert A. Frosch, the assistant secretary of the navy for research and development, last year told the House Armed Services Committee of a $20.4-million research program "to look at every possible submarine effect that we can think that a Polaris submarine might give rise to and examine whether it is a real vulnerability of the submarine to detection, to sea experiments, and try to develop fixes for these problems if any develop. It is an important part of keeping the survivability of that deterrent up."

SALT II, now underway in Geneva, is expected to begin grappling with the difficult task of controlling underseas deterrence beyond the earlier agreement to limit the number of vessels. But as evasive tactics become more sophisticated and sea-borne missile accuracy increases, the odds are that neither side will be willing to give up what it has never yielded before: a truly effective strategic weapons system. It is doubtful, too, that the U.S. Navy would ever concede any international waters to be out of bounds. And then, to compound the matter, France, with its go-it-alone nuclear policy, is building a fleet of four Polaris-type submarines, and it is reliably reported that the People's Republic of China has at least one under construction.

Amidst the stampede to underseas deterrents few questions are ever raised publicly about the perils inherent in the system—among them tenuous communications, opportunities for human error, and irrational acts that might evade "fail-safe" checks. When traditional international politics are blended with advanced military technology, the inevitable outcome is the assumption that safety lies either in superior arms or in assuring the survival of your adversary's destructive power. Such is the durability of Cold War thinking—even in this period of East-West *détente*—that more benign possibilities find no place in court. The impression created by SALT is that the arms race is letting up. The truth of the matter is that it is slipping beneath the waves, where in all likelihood it may thrive as never before. □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

SR REVIEWS Books

On Women—I: Failures of Love

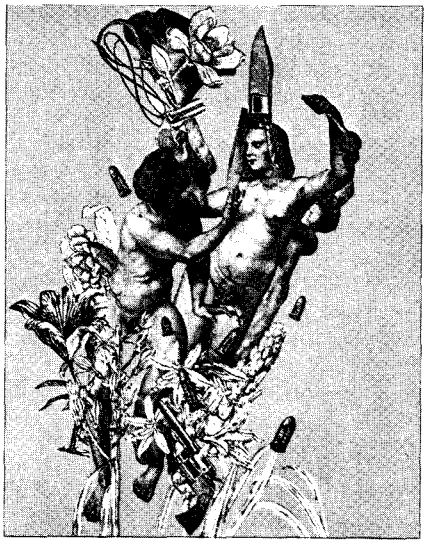
BY GENEVIEVE STUTTAFORD

COMBAT IN THE EROGENOUS ZONE. By Ingrid Bengis. 260 pages. Knopf. $6.95.

A glance at the guns and bullets swirling around the jacket design of *Combat in the Erogenous Zone* and anybody would be a fool not to run for cover. It would be a mistake to, though, because the book is infinitely more graceful, and much less combative, than either the title or design would indicate. Ingrid Bengis is a deeply introspective young woman and a first-rate talent who's wrestling with some significant emotional questions as she attempts to understand the verities (and how they've been further complicated by contemporary mores) of why love affairs fail—for her and, by extension, for other women. While other feminists have gone to the Capitol to fight the bread-and-butter skirmishes, Bengis's strategy is to move on the bedroom to stalk the enigma of love-hate; there isn't going to be any truce signing, her instincts tell her, unless the erogenous zones are demilitarized.

It's a complicated maneuver, and her mood throughout is tristful, her openness is painfully personal, and she doesn't expect that male attitudes can be changed overnight. *Vive la différence* is a cherished masculine aphorism, and Bengis hates the privilege it assumes: "hate" is the operative word she uses to censure the doer along with his deed. Before Bengis talks about love, she acknowledges "man-hating"

Genevieve Stuttaford is an associate book review editor of SR.



Cover art from Combat in the Erogenous Zone

—a squiggly, ugly, concealed emotion that she wants to flush from cover and deal with. (It's time for men as well, she suggests, to face their own hostility toward women.) Scratch any contented housewife or militant libber, and the chances are the flow of blood will expose man-hating cells.

Bengis hates nice guys and dirty old men equally. An "understanding" editor she lunches with to discuss her writing a book is judged just as harshly as the construction workers who verbally assault her with street-wise lingo and the sickies who expose themselves on the subways. Most men, she's convinced, haven't the courage to betray their sex or take a stand on behalf of humane behavior. Man-hating overwhelms Bengis, often at the most inappropriate moments, and no matter how squeamish she feels about it, it's always there as a defense against pain, a refusal to suppress the lessons of experience, and an affirmation of the catharsis of valid anger.

She turns that anger on herself whenever she catches herself using her sensuality (thereby debasing it) to curry male favor. All around us the emphasis is on shoddy sex, and somewhere along the line real feelings have been misplaced, or at least deemphasized. In keeping up with the fads of behavior—sexual freedom in the 1960s, antisexualism for the 1970s—Bengis (who is hardly unique) lost touch with her emotional needs.

The fads have dangled phony solutions to real problems: for example, Bengis looks at multiple relationships as an emotional issue, not a moral one. Does sexual permissiveness really answer a woman's needs? Not for Bengis, at any rate. Men, more often than women, she finds, are inclined toward multiple relationships and are able to seek sex for strictly physical release without the distraction of more complex impulses. (In a funny, telling aside, Bengis lets men in on the fact that women usually know when a lover's sudden burst of affection is actually a tip-off that he's just been with another lover.) Bengis is probably right in her suspicion that most women find it difficult (more so than they'll admit) to adapt to male promiscuity. They go along with it because something is better than nothing.

Bengis has tried the alternatives—long periods of celibacy (like virtue, hardly its own reward) and lesbianism (which has its own emotional problems). In one particularly revealing chapter Bengis discusses an evening spent at a gay bar, and the distressing reminder is that in any casual sexual involvement, regardless of the combination of genders, somebody is bound to get screwed.

A trusting, continuing, monogamous relationship, then, preferably female with male, is Bengis's only viable solution, even though her experiences tell her that nothing lasts forever (in each of her affairs just as her attachment begins to deepen, inevitably his has already begun to wander). But simply knowing that isn't reason enough for her not to persist; permanence may be

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

impossible, yet "there is something comforting . . . about being in the regular presence of one person who can adapt to varying dosages of your capacities and incapacities and for whom you can do the same . . . . Being possessive about one's happiness is a natural thing . . . . One would be crazy to give away what has been achieved with so much effort in the first place." □

On Women—II: The Couch as Rack

BY SALVATORE R. MADDI

WOMEN AND MADNESS. By Phyllis Chesler, Ph.D. Illustrated. 359 pages. Doubleday. $8.95.

This is an extremely important book, a signal that the women's liberation movement is coming of age. Phyllis Chesler, an assistant professor of psychology at City University of New York, writes with high passion and compassion about the problems of women, but these emotions alone would not distinguish her book from several others. What is unusual is that the passion is firmly rooted in professional research. Based largely on interviews with mentally ill females and on statistics citing mental hospital admissions by sex, *Women and Madness* cannot be discounted by fearful or complacent supporters of the status quo on the grounds that it is merely one woman's angry opinion. And those just a bit more open-minded may find themselves quite won over.

One of Chesler's main tasks has been to chart the actual behavior of females considered mentally ill. What emerges from the interviews and the research of other psychologists is that the symptoms shown by women are either ludicrously humiliating exaggerations of the female sex role or destructive, though valiant, attempts to break out of it. According to Chesler, the female sex role in our society is that of a slave who must "lose" through infinite compassion, patience, nurture, compliance, and loyalty in order to "win" the rather aloof approval and protection of a man in marriage. When a woman, in desperation over this thankless role, deteriorates into excessive passivity, self-hatred, and malaise, she is termed depressed. And when, also in desperation, she attempts to fight back, declines unwanted responsibilities and chores, becomes belligerent and flaunts her sexuality, she is termed schizophrenic. Both reactions are considered actual sickness by Chesler but are small wonder, in her view, given the crippling sex role involved.

Nor can the sick woman expect much help from psychotherapy. One of Chesler's keener observations is the startling similarity between psychotherapy and marriage, in that both institutions support, even depend upon, the sex role of female as slave. Although most patients are female, psychotherapists are predominantly male. Most mental hospital admissions are females, and they tend to stay longer and are readmitted more frequently than males. Usually the committing relative is the husband, with the aid of a male psychiatrist. The upshot is that while troubled males are tolerated by society and perhaps given special attention by their long-suffering wives, troubled females are treated like slaves who have become useless—so they are packed off to psychotherapy or an asylum. Too often the aim of treatment is to reconstitute the useful slave as she was. Chesler seeks other means for beleaguered females to obtain the love,

Salvatore R. Maddi is a professor of psychology at the University of Chicago.

THE PIN-UP: A Modest History. By Mark Gabor. Illustrated. 271 pages. Universe Books. $15.95.

THE COMPLEAT LOVER. By Derek and Julia Parker. Illustrated. 256 pages. McGraw-Hill. $15.95.

Where does women's liberation end and nostalgia begin? Or men's liberation, for that matter—which, we are informed, is what inspired Mark Gabor to produce his pictorial history of the pin-up? Well, in the case of *Film Fun* covers, the Petty and Varga girls, and Betty Grable, nostalgia has it hands down. The cuties of yesteryear, particularly of the golden 1930s and 1940s, are still enticing, no doubt about it, but humor does enter in (in the best, of course, it was always there). How innocent they seem, these come-hither, chummy optimists! The sultry look came generally before and after; it went out with the Depression, returned with the boys who gave Hitler and Tojo the old heave-ho. The book, which contains some 500 illustrations (about 10 per cent in color, plus foldouts and a folded poster jacket), goes back to the Gibson Girl, forward to our own odd age of the all-engulfing breast and other forms of porn, and sideways (on the notion that fair is fair) into beefcake and the likes of Cary Grant, Tarzan,

"Oh, you would, would you!" Drawing by George Petty for Esquire *(1935)*

and *Cosmo* nude Paul de Feu—who is, of course, the ex-husband of Germaine Greer. So much for nostalgia; on to liberation. There are, in fact, two texts. In the main one Mr. Gabor traces history and tries to come to grips with the Meaning of It All. The other text—a publishing first—is an introductory attack by Joan Nicholson. It is called "The Packaging of a Rape: A Feminist Indictment," and in it Ms. Nicholson discusses "the exploitation of women via the cheesecake tradition." True, true, true. In fact, and in sum, the book is equally exploitive—also slightly arousing, a bit more winsome, and quite a lot of rather stupid fun, which is what pin-ups were all about.

In contrast, *The Compleat Lover* is totally current: very coy and gauzy, gussied up like some interminable TV commercial, and exploitive of everyone, regardless of sex. There are photos and paintings on various romantic subjects, prose and poems by such famous talents as Henry James and Anon., stories of great lovers (Tristan and Iseult, the Duke and Duchess of Windsor), and even astrology games to play (no surprise: the authors' previous book was *The Compleat Astrologer*). Much of this potpourri is given over to photos of a youngish couple (presumably models) who prance around looking intense or vapid and sometimes both. The particular cause of feminist independence is handled by this same couple plus pedigreed dog and a classic, supercharged Mercedes-Benz, which she pilots until she meets him (that's the feminist part—she's rich), and then he takes the wheel. In sum, soft porn in prime; true to the genre and its market, there will be those who think it's "nice."

Incidentally, there are five black girls in *The Pin-Up*; there are no blacks at all in *The Compleat Lover*. □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

understanding, and freedom they desperately need and reluctantly concludes that they must band together as sisters and as mother-daughter units, at least until such time as sex roles are radically transformed.

Among the women interviewed who were in psychotherapy or mental hospitals were some who had been sexually seduced by their psychotherapists and some who had become committed lesbians. Chesler regards the seduced group as acting out the female sex role by submission to the dominant male, much as in marriage, and, in contrast, the lesbian group as clearly rejecting that conventional role. Lesbians, she found, are considered sicker, committed at an earlier age and more often to mental hospitals, and kept in treatment longer than their seduced counterparts. The psychotherapist-seduced females showed a dismaying fear of criticizing their seducers, even though these males were usually married, continued charging for "therapy," were surprisingly cold and inept as lovers, sometimes terminated needed therapy in pursuit of sex, ultimately rejected their "patients," and very likely were sleeping with several "patients" simultaneously. (As far as anyone knows, it is rare for female psychotherapists to sleep with male patients.)

Other analyses, though less dramatic, also show treatment to be based on acceptance of conventional sex roles. Is it any wonder that Chesler finds the institution of psychotherapy little more than another way of holding women down? Although forceful and sure in discussing the unfulfilled needs of women and the crippling effects of their present sex roles, Chesler has few definite solutions. This is not a weakness so much as an unwillingness to oversimplify. In raising more questions than she answers, she is always provocative, enlightening, and honest.

For example, should women seek Amazonian supremacy over men and control over the means of production and reproduction—or is this a transitory, though useful, developmental goal until they are stronger and men are more willing to grant equal status? Can society change sufficiently so that women may be heterosexual with dignity, or must they eschew marriage and look for sexual fulfillment among themselves? These questions are candidly posed and considered, but Chesler avoids pat answers, feminist or otherwise. Although she believes in the possibility of a society in which men and women can interact as equals, the role patterns of the past hardly incline her toward optimism about its early achievement.

In addition to interviews and hospital statistics, the book includes extensive quotes from feminist and nonfeminist literature written by women and from sympathetic and unsympathetic—but always revealing—writing by men and psychotherapists. Chesler also analyzes Western mythology and the lives of several notable women that ended badly, and she includes carefully selected poetry and illustrations. The book is an artistic and satisfying whole, the more so because the wide range of material testifies to the pervasive social and cultural roots of women's problems. It is remarkable, for example, to follow the deterioration of female power in mythology, from the tales of Demeter and her daughters, Persephone, Psyche, Athena, and Artemis, to the ultimately impotent Virgin Mary and Joan of Arc, and to see how consistent this decline is with the current powerlessness of women politically and socially. One could argue with the interpretation of a statistic here and the ambiguity of a passage there, but this would be hair-splitting, given the overall merit of the work.

Phyllis Chesler

Chesler is one of the new breed of social scientists, well trained, skilled, and literate in many fields, whose loyalty is to the public rather than to any establishment. Considering the painful, shocking nature of its subject matter, *Women and Madness* is more robust than bitter, more hopeful than desperate—in the best sense a consciousness-raising effort. □

Answer to Wit Twister, page 57: rulest, lurest, luster, rustle, result, sutler, ulster.

Uprooted in L.A.

TURKEY HASH. By Craig Nova. 197 pages. Harper & Row. $6.95.

BY JERRY G. BOWLES

One of the theories often advanced to explain the long-standing dominance of southern and Jewish novels in America is that only southerners and Jews have managed to retain that peculiar sense of place and historical continuity of experience which is so necessary for literary sustenance. People outside these cultural experiences are, the theory goes, uprooted not only in the physical sense but also in terms of spiritual connection.

Much very recent fiction, however, has taken place precisely within this void, and the condition of loss—with its subsequent impact on behavior—is rapidly becoming a literary tradition in itself. Major characters have even become interchangeable between novels. Thus, Craig Nova's Niles Cabro is Steve Katz's Astronaut, who is Ken Gangemi's Robert Olt, who is David Rhodes's Reuben Sledge, and so on.

Nova's first novel flows from Los Angeles (a city that has become a breathing metaphor for uprootedness) to San Francisco (failed promise) to southeastern Oregon (the new hope, close to the land). Niles Cabro, the protagonist, becomes more of a . . . well, psychotic, as the story unfolds. He leaves behind in L.A. his father, Hawkeye, who can never remember Niles's name and whose only contact with reality is his constant tinkering with the TV set; Burned, his mother, an incoherent epileptic; and Sis, a Lolita type with a bad skin condition whose major passion is masturbating her boyfriend, Rodeo-rider, while he drives the purple '56 Chevy. Niles runs away from home—although no one cares—and joins a sadistic band of young terrorists who manage a grubby existence by their wits. He escapes from them temporarily and is befriended by an encyclopedia salesman who sets him up in business with this blessing: "I hope you do better than I did, kid. In all those lousy years, I only got one blow job."

Niles meets a "nice" girl whom he either kills or doesn't kill, depending upon how you read it. Ultimately he rejoins Lophead, his fellow terrorist, to play the tragedy out to its end.

What distinguishes this novel from others dealing with the impact of up-

Jerry G. Bowles is a writer and editor of two collections of avant-garde fiction, This Book Is a Movie *and* Art Work, No Commercial Value.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

rootedness on behavior is that Nova assumes that the reader will accept this condition of anomie as a simple fact that requires no historical development of the characters to justify. They are what they are simply because that's the way they are. It doesn't really work, and, despite the fine writing, the novel is, in the end, oddly unmoving.

Yet Nova is a fine writer. His style is telegraphic and minimal, yet strangely evocative of landscape. His characters appear both real and surreal as they act out strange rituals and plot insane acts. His handling of pace and dialogue is superb, and the writing in general has the feel of a polished hand. Despite its ultimate coldness, it is a remarkably accomplished first novel and marks the launching of a stylist with the promise of, say, a John Hawkes. One could do a lot worse. □

TRADE WINDS

BY ALAN GREEN

Washington in Biography

To begin an important topic with a bit of trivia: George Washington did *not* have wooden teeth. Over his later years he was fitted with dentures of various substances, including hippopotamus ivory, but—Parson Weems types notwithstanding—never wood.

This fact, and the others that follow, emerged during a recent meeting with James Thomas Flexner, who, since 1960, has been writing a four-volume biography under the omnibus title *George Washington*. The three volumes previously issued by Little, Brown are: *The Forge of Experience (1732–1775)*, *In the American Revolution (1775–1783)*, and *George Washington and the New Nation (1783–1793)*. Now comes *Anguish and Farewell* (1793-1799), bringing to completion what has been called one of the most distinguished American biographies of our generation.

James Flexner came to the writing of this work as the creator of numerous widely read political and social histories of our early period. In *Doctors on Horseback* he delineated the pioneers of American medicine. *Steamboats Come True* celebrated early American inventions. *America's Old Masters*, *Gilbert Stuart*, and *The World of Winslow Homer* were among his important contributions to art history. But in all likelihood *George Washington* will be the work for which Flexner will be most admired and longest remembered.

The seven-volume Douglas Southall Freeman *George Washington* is the comparable biography that comes to mind. But though the two works are equally involved with Washington's world and his unique impact on it, Freeman's is less concerned with Washington's personal life than Flexner's is. Flexner is deeply involved with Washington's nature, his motivations, his behavior. For instance, he is interested in more than the fact that Washington could have made himself a king or dictator. He is fascinated by those elements in Washington's character that made him history's only major figure to have had such an opportunity and to have turned away from it—not momentarily, as did Julius Caesar, but permanently. And, one hopes, unforgettably.

Flexner dissipates many Washington myths. George wasn't born mouthing a silver spoon; rather, he was the youngest among half-brothers who—to his near exclusion—inherited the estate. The myth says he never swore, but his officers recorded his ability to use a round military oath. He was temperate, but not, as the myth says, abstemious. (In the days immediately following the assassination of John Kennedy, many televised clergymen read prayers "written by George Washington." Flexner says he never wrote one.) Washington's heart turned often to Mount Vernon; yet from his youth his eyes were on the West, and he sensed America's future there long before most of his contemporaries. According to Flexner, no President until Jackson was so shaped by the wilderness.

James Flexner deliberately approached his research and his writing as if he had never heard of Washington before. Basing his work almost entirely on original documents, he has produced a portrait that leans on no intermediary's interpretation. He has also produced a Washington who baffles those cynics who can't believe an American could reach such a pinnacle without devious personal motives. Flexner has heard from some of them—as he has heard from dismayed, unthinking idolators who have, for their own worshipful convenience, created a being less than human, one as wooden as the teeth they mistakenly think he had.

Another Washington biography—a one-volume work by North Callahan—was recently published by William Morrow. Callahan is professor of history at New York University, and his *George Washington, Soldier and Man* (the tenth of his books, most of them on American history) concentrates on the war period. In a recent talk Callahan said he was fascinated by "the man of aristocratic English descent who stuck his neck out to lead the forces of our Revolution and yet was sufficiently a 'law and order' man to preside over the Constitutional Convention and steer its opposing factions into the founding of an enduring government." North Callahan describes his book as "a scholarly work in a popular volume." Incidentally, that first name is, as you've probably assumed, a family one. And from whose family does this admiring biographer of Washington descend? Why, from that of George III's Prime Minister, Lord North, of course.

The Middle West in 1940

By the time you read this, you may have begun to hear about Kathryn Morgan Ryan and her novel *The Betty Tree*, which Trident Press published last month. "A savage book" is how the author describes it; although its locale is the Middle West and farm country, "there's nothing bucolic, straw-chewing or corn-fed" about it. Its time is the early 1940s; its author is mature enough to remember that teen-agers weren't invented by the current generation and notes that behind Grant Wood's grim American Gothic faces there lay profound sexual and moral conflicts. She also points out that in the Forties there were still-living pioneers who had seen vast buffalo herds, endless open plains, and freely roaming Indians and that the sons of these pioneers were founding new towns and industries and their grandchildren were driving to high school in the same jalopies they went out to make love in before flying off to war.

The Betty Tree may remind some of the film *The Last Picture Show* for its *trompe l'oeil* scenes of dusty streets and lonely training air bases, of gun collections glinting with old Colts and Winchesters, of skillful kitchen-table surgery, of wives grim-lipped with their husbands' guilty secrets, of girls reaching frantically for experiences they're ever so certain their mothers never had.

Kathryn Ryan wrote her novel "out of homesickness and a need to celebrate my country and my people." It had lived in her mind for a decade; she outlined it in less than a week and spent three years, working in longhand for eight-hour days, writing it. And she was, and still is, editor and researcher for her husband, who happens to be the Cornelius Ryan who wrote those huge bestsellers *The Longest Day* and *The Last Battle*. Before they married, she was an editor at Condé Nast, for *House and Garden*, and at Time Inc. Nowadays the Ryans, who have two children, live and work in a Frank Lloyd

Answer to Literary Crypt No. 1535

Most history is just gossip that has grown old gracefully.

Sydney J. Harris

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

505. COLE
Robert Kimball and Brendan Gill
(Counts as two)
Publ. Price, $25.00

591. SOCIALISM
Michael Harrington
Publ. Price, $12.50

518. THE HOUSE OF LIFE: Rachel Carson at Work
Paul Brooks
Publ. Price, $8.95

355. IBSEN, A Biography
Michael Meyer
Publisher's Price,
Publ. Price, $12.95

143. THE ROCKY COAST
Rachel Carson
Publ. Price, $6.95

346. UPSTATE
Edmund Wilson
Publ. Price, $8.95

003. ELEANOR AND FRANKLIN
Joseph P. Lash
Publ. Price, $12.50

196. CRISIS IN THE CLASSROOM
Charles E. Silberman
Publ. Price, $10.00

573. BIRDS, BEASTS, AND MEN
H. R. Hays
Publ. Price, $8.95

511. POE POE POE POE POE POE POE
Daniel Hoffman
Publ. Price, $7.95

110. THE DECLINE OF THE WASP
Peter Schrag
Publ. Price, $6.95

215. THE 12-YEAR REICH
Richard Grunberger
Publ. Price, $10.00

305. THE MORTGAGED HEART
Carson McCullers
Publ. Price, $7.95

337. I'M OK—YOU'RE OK
Thomas A. Harris, M.D.
Publ. Price, $5.95

328. THE CITIZEN KANE BOOK
Pauline Kael, Herman J. Mankiewicz & Orson Welles
Publ. Price, $15.00

580. BELLA! Ms. Abzug Goes to Washington
Bella S. Abzug
Publ. Price, $7.95

485. FLANNERY O'CONNOR: THE COMPLETE STORIES
Publ. Price, $10.00

498. GROW IT!
Richard W. Langer
Publ. Price, $8.95

102. STORIES AND PROSE POEMS
Alexander Solzhenitsyn
Publ. Price, $7.95

165. MYSTERIES
Knut Hamsun
Publ. Price, $8.95

564. NO NAME IN THE STREET
James Baldwin
Publ. Price, $5.95

577. FRANZ KAFKA: THE COMPLETE STORIES
Publ. Price, $12.50

494. BODY TIME
Gay Gaer Luce
Publ. Price, $6.95

473. TEACHER AND CHILD
Dr. Haim G. Ginott
Publ. Price, $5.95

461. UNCOMMON SENSE
James MacGregor Burns
Publ. Price, $6.95

021. MEMOIRS OF HOPE: RENEWAL AND ENDEAVOR
Charles de Gaulle
Publ. Price $10.00

074. THE DANCE IN AMERICA
Walter Terry
Publ. Price, $8.95

408. WHO OWNS AMERICA
Walter J. Hickel
Publ. Price, $6.95

035. THE MYTH OF THE MACHINE: Technics and Human Development
Lewis Mumford
Publ. Price, $12.00

487. CITIZEN NADER
Charles McCarry
Publ. Price, $7.95

559. THE SAVAGE GOD
A. Alvarez
Publ. Price, $7.95

520. THREE POPES AND THE CARDINAL
Malachi Martin
Publ. Price, $7.95

018. WHO PUSHED HUMPTY DUMPTY?
Donald Barr
Publ. Price, $10.00

006. WHAT I HAVE LEARNED
A Saturday Review Book
Publ. Price, $6.50

566. RUN THROUGH: A MEMOIR
John Houseman
Publ. Price, $9.95

395. ARIEL AND CROSSING THE WATER
Sylvia Plath
(2 Volumes counts as one)
Combined Publ. Price, $10.90

082. DESCHOOLING SOCIETY
Ivan Illich
Publ. Price, $5.95

268. DUCE!
Richard Collier
Publ. Price, $12.50

496. THE CASE OF THE MIDWIFE TOAD
Arthur Koestler
Publ. Price, $5.95

223. MEET ME IN THE GREEN GLEN
Robert Penn Warren
Publ. Price, $7.95

099. THE NEW INDUSTRIAL STATE
John Kenneth Galbraith
Publ. Price, $8.95

049. KNOTS
R. D. Laing
(Deluxe Edition)
Publ. Price $5.95

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Can a book club change your mind?

It *can* if its name is Saturday Review. It can broaden it. Enlighten it. Challenge it. Bring it insights. Fill it with new ideas...get rid of old ones. And, on occasion, "boggle" it.

An idle boast? Not with the kind of books we offer. Our policy is simple, but firm: A book has to really say something, or it's not for us. Just glance at our introductory listing...History-makers. Opinion-molders. Myth-killers. Curiosity-quenchers. Mind-openers. The most important biographies, revealing memoirs, and meaningful fiction being published today. The cream of the literary crop. Significant. Refreshing. Informative. Timely. Fascinating. In short, delicious reading if you've got the appetite.

Our authors will turn you on to what's happening (or not happening!) in our society and environment, in politics, the arts, science, education, communications. They are people who are not only capable of changing your mind, but exciting it with new ideas. Exposing it to new concepts. Absorbing it in new interests.

If you're only slightly impressed...*good.* We identify with people who have high standards and know what they want. Here's what we suggest: try the Saturday Review Book Club. We'll give you any four books listed here for only $1 to start you off (a total value worth up to $52.95).

As a member, you simply agree to take four more books during the coming year—at savings averaging 20% off publisher's prices. And we guarantee you this...should you ever receive a book you don't wish to read and own, you may return it within 10 days for full credit.

The Saturday Review Book Club. It may change your mind. The change will do you good.

Select any 4 books now for just $1.

Saturday Review Book Club
Huntingdon Valley, Pennsylvania 19006

Please accept my application for membership in the Saturday Review Book Club and send me the four books whose numbers I have printed in the boxes below. Bill me only $1 plus shipping and handling for all four.

☐ ☐ ☐ ☐

If I am not delighted with these books, I may return them within 10 days; my membership will be canceled and I will owe nothing.

If I keep them, about every four weeks I will receive the Club's free newsletter describing the forthcoming selection, plus dozens of alternates. If I wish to receive the selection, I need do nothing: It will be shipped to me automatically. If I prefer an alternate, or no book at all, I will notify you by the date specified by returning the convenient form always provided.

I need purchase only four books during the coming year—at savings averaging 20% off publishers' prices. I may cancel my membership any time after these purchases. A modest shipping and handling charge is added to all shipments.

Mr.
Mrs. _____
Miss (please print)

Address _____

City _____ State _____ Zip _____

1 1223S

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Wright-inspired house in Ridgefield, Connecticut. She's an independent woman who shrugs off the term "liberated." Had she shown her novel to her husband while writing it? No, she hadn't wanted his comments to influence her before it was finished. He's working on a new book now himself—and, for the first time in his career, he's doing it in longhand.

Ou Est Salle 100?

An untypical English dictionary is coming from Macmillan this month. *British Self-Taught: With Comments in American* is a collection of some five thousand British words with their native usages and their American equivalents. Its author is Norman Schur, an American who practices law part of the year in the United States and the rest of the time in the United Kingdom. His wife is an Englishwoman and an actress with the Old Vic; they have homes in Connecticut and Sussex, and Schur was originally urged to write this book by the late A. C. Spectorsky, literary and social critic and *Playboy* editor. Schur's book touches the obvious bases ("petrol," "bonnet") and goes on to "bowler-hatted" (to be demobbed), "demobbed" (to be demobilized), and "pimp" (a bundle of kindling wood down Kent way). Then there's the familiar euphemism "loo." According to Schur, it doesn't derive, as often supposed, from mispronunciation of *l'eau*, nor, as sometimes conjectured, from a pun on Waterloo, but from the practice of some old French hotels of designating the hall bathroom as "salle 100." English travelers, possibly in haste, mistook the first figure for the letter *l*. □

SHORTER REVIEWS

SCIENCE AND CONTROVERSY: A Biography of Sir Norman Lockyer. By A. J. Meadows. Illustrated. 331 pages. Massachusetts Institute of Technology. $16.95.

This biography of Sir Norman Lockyer, the Victorian astronomer who was, by no means incidentally, the founder and editor of *Nature* magazine, is interesting chiefly for its portrait of the sheer activity of scientific discussion in nineteenth-century England. Lockyer emerges as something of a prototype of the earnest Victorian, rushing from public service to private study with an unflagging energy—interrupted by occasional breakdowns from overwork. It was a world both cozy (he knew Huxley and just about everyone else) and argumentative (whole scientific campaigns seemed to be fought in letters-to-the-editor columns) but above all unafraid of diversity: Lockyer developed a spectroscopic method for studying solar prominences in daylight, discovered helium, proposed that the atom was not an immutable entity, studied the astronomical orientation of Stonehenge and Egyptian temples, and more. All this should make fairly interesting reading but does not. Written by the Professor of Astronomy at the University of Leicester, the book does manage to simplify some of the scientific material for lay readers, but its style seems to approximate that of Lockyer's lesser contemporaries and as a whole is almost impenetrable in its plodding dullness.

SCIENCE AND TECHNOLOGY IN ART TODAY. By Jonathan Benthall. Illustrated. 180 pages. Praeger. $8.95; paperback, $4.95.

The latest in Praeger's World of Art series, this sketchy, informative guide provides a brief rundown of the ways artists are appropriating developments in science and technology for their own purposes. There are sections on computer and laser holography, light shows, kinetic art (possibly on the wane), and the theoretical implications of recent work in ecology and linguistics. Benthall, who heads the lecture program at London's Institute of Contemporary Arts, admits to disquietude about some of the more behavioral-oriented advances (e.g., the SEEK computer environment) and freely allows the difficulty of applying standard definitions to new media, but his tone, while often skeptical, has the nice enthusiasm of an explorer in the yet-to-come. There is a helpful bibliography for those who want to pursue the matter further, and the illustrations, happily, are well integrated with the text so that the reader can see what Benthall's talking about while he's talking about it.

WORLD WITHOUT BORDERS. By Lester R. Brown. 395 pages. Random House. $8.95

The author of *Seeds of Change: The Green Revolution and Development in the Seventies* (1970) has extended his agricultural bailiwick in this new book to provide nothing less than an ecological overview, "a global perspective for considering the future." Such overviews, however, like survey courses, tend to gloss over complexities to provide a general blur, and *World Without Borders* is no exception. Brown's theme is that our growing economic interdependency demands international problem-solving, a "global society." After running through an "Inventory of Mankind's Problems," all of them dismal (population is ever on the rise, along with pollution and unemployment, and in the process the rich are getting richer and the poor poorer), he takes a look at the ways we are already beginning to form a global economy (primarily the multinational corporations), then proceeds to outline some approaches for dealing with it (international regulatory bodies, government cooperation, "a new ethic"). How all this is to be worked out politically is another matter. That Brown's major points are worthy (not to say familiar) is beyond question, but one wonders how they are possibly served by such bland position-paper stuff as this. (The text is peppered with subheads like "English: A Global Language?") The tone is of the kind of buoyant optimism that makes even the ordinarily skeptical reader feel cynical. He believes, for instance, that "governments cannot remain indifferent" to public opinion in this age of mass-communication systems. And the conclusion is so clouded in shopworn rhetoric that it seems an act of faith: "If our society is to survive and progress in the seventies and eighties, we need a new ethic, a reordering of global priorities and fresh leadership." This is the language not of vision but of inoffensive committee projection, and it makes this book as good an example as any of why such a pressing subject as ecology has made, on the whole, such dull, repetitive reading. Perhaps its justification is that there are some alarms that cannot be sounded too often.

THE MAKING OF A PSYCHIATRIST. By David S. Viscott. 410 pages. Arbor House. $8.95.

This young psychiatrist's account of his professional life and training, from medical school through various psychiatric hospitals and his own psychoanalysis, is remarkable on several counts. First, it gives a frank and revealing inside portrait of a profession that, for better or worse (probably better), has become an important force in American life and that (doubtless for worse) has really not been much written about for outsiders. It is all here—the victories, the failures, the professional wrangling and political infighting (including much medical "old boy" stuff), the theoretical vaguenesses, the therapy techniques and dedication and hopes of the best and most honest. Second, it is an engagingly personal account. Because Dr. Viscott is blessed with intelligence, wit, a kind of horsy determination, and a deep sense of humanity (plus enough of what some of his unenchanted colleagues may call narcissism to write this book), one is, willy-nilly, always on his side. But he has let the warts show here, too: errors, mis-

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

diagnoses, moments of doubt and near-panic, a sublimely easy and at times perhaps self-serving charm. Third, the book is compellingly readable. It is full of funny and suspenseful, ultimately serious and moving stories and of wonderfully cogent and individualized portraits—of patients, nurses, doctors, heads of institutions. Like life, it's a very mixed bag; the doctors, for instance, include a few charlatans and many more who are simply not very gifted people, mostly well-meaning but not very often as alert or perceptive or empathetic as their patients need them to be, and a few who are genuinely able and dedicated and caring. In the end, quality of character and feeling seems to count as much in the making of a good psychiatrist as therapeutic experience and ability; and honesty—in the sense of relating to the integrity of others and doing so loyally in awareness of both the human and professional responsibilities and the humbling uncertainties involved—is what is first and last required. A demanding calling; a stirring and excellent book.

ATLAS OF ANIMAL MIGRATION. By Cathy Jarman. Illustrated. 124 pages. John Day. $10.

ATLAS OF WILDLIFE. By Jacqueline Nayman. Illustrated. 124 pages. John Day. $10.

These two new companion volumes, designed primarily for the school and library market, are examples of what good science books for young people ought to be and, with knowledgeable attention and caring, can be. The text of each is efficiently lucid, unmawkish, and full of information both on what we know and on what we can only surmise. The full-color illustrative material of each consists of pastel and watercolor drawings (land animals, fishes, etc.), diagrams (experiments and hypotheses, e.g., how birds navigate), and excellent maps: migration and emigration routes of various species in *Migration* and habitats (detail maps with animal silhouettes superimposed) in *Wildlife*. Why animals are where they are, why some move about and how they find their ways, and why time cycles and distances vary so widely—these are endlessly fascinating subjects, and once into them, one wants to know more and more. These large-format (and, be it said, slightly high-priced) volumes, models of clarity on most intricate and complex matters, do not tell all; but they do provide a global view of life patterns that become truly extraordinary when seen from that global perspective. The books are obviously aimed for ages ten to seventeen (the ghetto age in book publishing), but eight-year-olds will be intrigued, and curiosity need not end with high school.

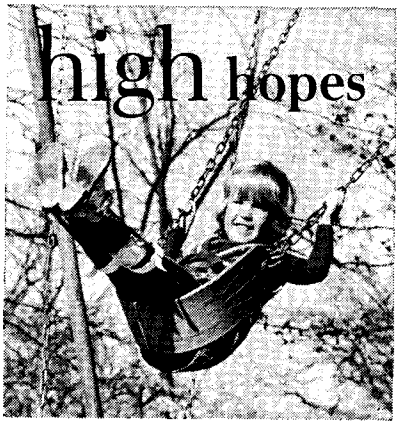
FOR THOSE I LOVED. By Martin Gray with Max Gallo. Translated from the French by Anthony White. Illustrated. 351 pages. Little, Brown. $8.95.

There are some stories so tragic that the mere writing of them seems an act of faith. Martin Gray, only fourteen when war broke out in 1939, spent the early years of his adolescence facing the daily horrors of the Jewish ghetto in Warsaw. Agile and determined, he began "crossing" into the Aryan sector on streetcars to get food for his family and soon set up an elaborate smuggling system with the help of some Polish toughs. Though Gray seemed to have more than the usual quota of nine lives, every day was a desperate gamble and eventually he lost; along with his mother and two younger brothers, he was taken off to the concentration camp at Treblinka. His family was led to the gas chambers, but Gray survived on various work squadrons until, finally, he was made part of the death squad at the notorious "lower camp" (his job was carrying corpses from the gas chambers to the open-pit graves). Miraculously, Gray escaped. Joining the resistance, he made his way back to Warsaw in time for the famous ghetto uprising of 1943 (during which he saw his father killed). He survived that, too, and eventually joined up with the advancing Russian Army. Made an officer and decorated, he was put to work for the NKVD, ferreting out Nazis in hiding, but then decided this was little better than working for "the butchers" and escaped once more—this time to the West and an aging grandmother in New York. He was twenty. His story thereafter is one of drive and material success (he made a fortune importing china and antiques for Third Avenue's burgeoning postwar market), a breathless race against nightmares and the past. It was only when he met Dina, his wife, that he approached peace and with her fashioned a fortress in the south of France, soon filled with their four children. Yet even this idyll was temporary. In 1970 a forest fire destroyed not only the house but all of his family. The events of this book are of such a relentless nature, and the account of Treblinka alone so horrifying, that they are nearly unbearable (indeed, Gray came close to suicide). But Gray has set out neither to entertain nor inspire—he is giving testimony. His story is thus not only an extraordinary document of survival and of a man's will to live but a depressing reminder of why such a will must so often be called indomitable.

SOLUTION OF THIS WEEK'S KINGSLEY DOUBLE-CROSTIC (No. 2020)

BRUCE HUTCHISON:
(and Andrew Snaddon)
CANADA WEST

Vancouver sprawls over the silt carried down by the river through geological aeons, now overlaid in less than a century, by mans ravenous labors. He has worked hard and prospered, but his skyscrapers are mere concrete exclamation marks to punctuate an unlikely tale long preceding his arrival.



birth defects are forever... unless you help

March of Dimes

THIS SPACE CONTRIBUTED BY THE PUBLISHER

"So well written and so thoroughly imaginative in its superbly organized exploration of almost every facet of death, dying, and the psychological significance and consequences of our attitudes toward those shunned subjects, that an intelligent reader... might easily read through—and finish the book the beneficiary of a deepening experience." —Publishers Weekly

The Psychology of Death

ROBERT KASTENBAUM & RUTH AISENBERG

"Lucid and relevant."—Library Journal

$11.95 at your bookstore or

SPRINGER PUBLISHING COMPANY, INC. 200 Park Ave. S., N.Y. 10003

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Tenorial Toast, Maazelian Verdi, Zylis-Garan Szymanowski

BY IRVING KOLODIN

Luciano Pavarotti, the newest tenorial toast of two continents, returned to the Metropolitan Opera (after customary triumphs in San Francisco) to a hero's welcome. This was conditioned not merely by his mammoth size and arousing endowment but by the actual performance of a heroic feat: Rodolfo in *La Bohème* and Edgardo in *Lucia di Lammermoor* on successive evenings.

This was not planned to demonstrate his ability to do the undoable just to prove it could be done. It was, rather, a response to an extremity in which the management found itself without a tenor for *La Bohème* on the night preceding Pavarotti's scheduled reappearance in *Lucia*. Rather than standing on ceremony—which would take a rather large area, considering his bulk and girth—Pavarotti put in an unscheduled appearance before an audience expecting Nicolai Gedda's Rodolfo. He didn't do his gifted colleague a disservice.

The "double" might have been more difficult had it occurred in reverse order. Ordinarily speaking, the tenor's music in *La Bohème* flows freely, whereas that in *Lucia di Lammermoor* requires more of a push behind it. But just as Pavarotti's equipment is not ordinary, so his response to unusual demands is not to be discussed in ordinary terms.

This *Lucia*, it should be noted, also found Renata Scotto singing the title role for the second successive evening. Its special interest was the revelation of Pavarotti's growth in the part since he was last performing it here. This is not to be regarded as another reference solely to physical size. His performance is, rather, a composite of inner and outer values, physical and temperamental, molded into an entity rarely equaled in the part. The Contract Scene can be real or fustian, depending on the credibility a tenor brings to Edgardo's denunciation of Lucia. Tito Schipa, a rather small man, made it intensely believable in one way; Pavarotti, with his size, does it in quite another. Those who cherish standards, even in the least likely places, should add it to their scale of weights and measures for future performers of the part.

To Miss Scotto's credit it may be said that she met the challenge of singing two major roles in twenty-four hours with equal distinction. A delay prior to the beginning of Act II was prompted by her desire for a strength-supporting vitamin B-12 injection. This, and the Mad Scene, enabled her to carry on at full voice.

Lorin Maazel's first venture in New York as music director of the Cleveland Orchestra was, with all the pomp befitting the circumstances, a performance in Carnegie Hall of Verdi's great *Requiem*. In addition to one of the world's great orchestras and a homegrown chorus of which Robert Page is the director, the occasion brought together a quartet rather different from the one that had performed the work the week before in Cleveland. As announced, that group included Martina Arroyo, soprano; Shirley Verrett, mezzo; Placido Domingo, tenor; and Bonaldo Giaiotti, bass. In the Carnegie Hall performance Domingo was replaced by Nicolai Gedda and Giaiotti by Cesare Siepi.

By any musical measure it was one of the most closely knit, tightly organized performances of the *Requiem* to be heard here in recent years (including a great one by Maazel's predecessor, George Szell). The effort expended by Maazel to clarify each of the celebrated trouble spots in a notoriously difficult work was evident in the breathlessly hushed pianissimo with which it began, the lightly dancing delivery of the Benedictus chorus in the Sanctus, and Miss Arroyo's solidly centered top B-flat at the end of Requiem Aeternam. The last, of course, is not ordinarily an inaccessible high note, but here it is treacherously exposed. Miss Arroyo performed it perfectly, if perhaps only *pp*, not *pppp*, as Verdi pitilessly marked it.

Withal, Maazel's feat was more one of execution than re-creation. The science of the performance was formidable, its humanity somewhat circumscribed. Perhaps it is not within the nature of man for a conductor of forty to feel the reality of this *Requiem* as deeply and keenly as an older one. Such sections as the Lacrymosa and Lux Aeterna were turned out with fastidious balance and excellence of articulation, sometimes to the detriment rather than the enhancement of mood. It was, in a contemporary image, beautifully packaged rather than profoundly felt.

As heard in New York, the quartet was rather heavily weighted on the female side. The two ladies had arranged a true blend of their beautiful sounds, but neither Gedda nor Siepi has today the weight or the richness to complement such Verdian vibrance. In any event, it was another milestone on Maazel's march to the uplands attained by few conductors in any generation.

Certainly, there must be better ways to initiate a series called The Art of the Lied than Teresa Zylis-Gara provided at the beginning of such a sequence in Carnegie Hall. It was described as the Polish opera soprano's first recital in America, which was all too evident in the task she posed for herself. Ten Brahms songs, six of Karol Szymanowski, and another eight of Rachmaninoff would be taxing in stylistic variety and verbal virtuosity for three experienced recitalists, rather than one inexperienced one.

After a rather unequal contest with such demanding matters as Brahms's "Liebestreu," "O kühler Wald," and "Feldeinsamkeit"—musically conscientious, of course, for she is that kind of singer, but temperamentally understated—Miss Zylis-Gara was quite another kind of singer in Szymanowski's *Piésni Muezzina szalonego* ("Songs of the Foolish Muezzin"). It was a consideration, of course, that she shares a language and a background with her great compatriot of a prior generation. But the songs are as much cosmopolitan as they are nationalistic, tinged with an exoticism hardly native to Poles. Miss Zylis-Gara brought to them the aware, sophisticated sense of nuance inherent in everything of Szymanowski that has been heard here. An unprogramed change for an unexplained reason brought Ryan Edwards to the piano in place of the announced Helmut Deutsch. The support he gave to Miss Zylis-Gara transcended any need for indulgence. □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

All the arts are in Saturday Review/THE ARTS

A freeing of your imagination.

A challenge to your senses.

Today we are more open to our feelings. And the arts have opened up too.

They're no longer the exclusive property of concert halls and museums and critics who seem to write only for other critics.

The three B's, of course. But also jazz, pop and rock. And Roberta Flack Human Kindness Day.

The old masters, but also the baseball-glove chair, snorkel lamps, photographs by inmates of Sing Sing.

O'Neill, Williams and Miller. But also the year of the new playwrights.

In fact, the world of the arts has expanded so, even well-informed people scarcely recognize it. That's why it takes the whole of a magazine to cover it all.

That's why...

Saturday Review/THE ARTS

The new Saturday Review/THE ARTS has undertaken the pleasurable task of putting you in touch with everything that offers a respite from clichés.

Because the arts are highlighted by specific events, Saturday Review/THE ARTS will have eight regular departments: Cinema; Theater and Dance; Art; Entertainments; Architecture and Design; Music; Writing; and People and Ideas. It will also recommend books, television shows and other creative and performing arts.

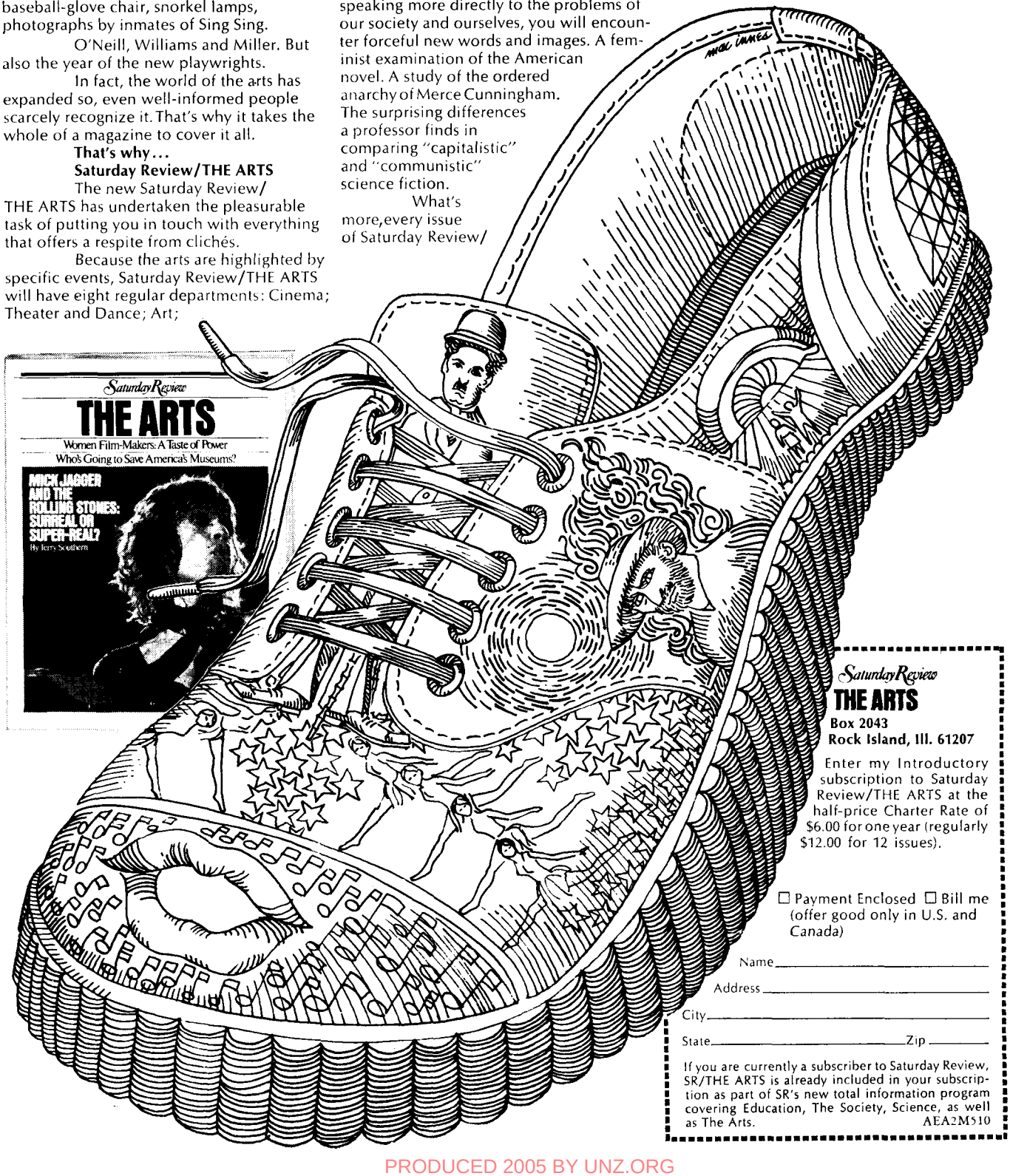
But because the arts are too restless today to be compartmentalized, much of Saturday Review/THE ARTS will deal with new forms and mixtures. The sleek new home appliances from Italy. Fiber sculpture. The world's leading behaviorist writing on "having" a poem.

And because artists and critics are speaking more directly to the problems of our society and ourselves, you will encounter forceful new words and images. A feminist examination of the American novel. A study of the ordered anarchy of Merce Cunningham. The surprising differences a professor finds in comparing "capitalistic" and "communistic" science fiction.

What's more, every issue of Saturday Review/THE ARTS is almost a work of art in itself—lavish with color, designed and illustrated by some of the finest artists and photographers today.

Special half-price Charter Rate

If you naturally gravitate to the "arts section," you ought to try the magazine devoted totally to the arts. Act now, and take advantage of the Introductory half-price Charter Rate: $6.00 for one year (regularly $12.00).


Saturday Review
THE ARTS
Women Film-Makers: A Taste of Power
Who's Going to Save America's Museums?
MICK JAGGER AND THE ROLLING STONES: SURREAL OR SUPER-REAL?
By Terry Southern

Saturday Review
THE ARTS
Box 2043
Rock Island, Ill. 61207

Enter my Introductory subscription to Saturday Review/THE ARTS at the half-price Charter Rate of $6.00 for one year (regularly $12.00 for 12 issues).

☐ Payment Enclosed ☐ Bill me
(offer good only in U.S. and Canada)

Name_____

Address_____

City_____

State_____ Zip_____

If you are currently a subscriber to Saturday Review, SR/THE ARTS is already included in your subscription as part of SR's new total information program covering Education, The Society, Science, as well as The Arts. AEA2M510

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

An Evening With the Enchanted Mesa

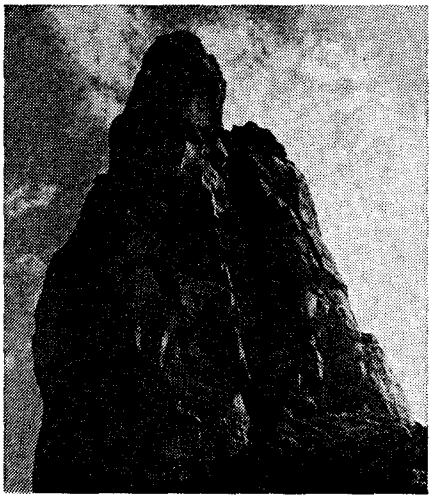
BY PATTI HAGAN

I fly to Santa Fe, New Mexico, and begin driving toward the reservation of the Acoma Indians, accompanied by four friends. Our destination is the Enchanted Mesa, named by the Acoma tribe, who lived there in prehistoric days (the tribe's pueblo is now on a nearby mesa). This journey from my New York apartment was inspired by Edward Abbey's remarkable book *Desert Solitaire*. I hope to see in the desert what Abbey saw: "the strangeness and wonder of existence emphasized . . . life not crowded upon life as in other places but scattered abroad in spareness and simplicity, with a generous gift of space for each herb and bush and tree."

Fifty miles past Albuquerque we turn south on a dirt road. No astonishing mesas—just prickly pear, juniper trees, and beer cans at regular intervals. We round a bend, and suddenly we are on a collision course with a red, rainbowed ship, an enormous cumulus mound. We stand beside it, feeling tiny and colorless. The Enchanted Mesa is more than 400 feet tall. We are, as Abbey said, "surrounded by a different world, older and greater and deeper."

We cook thin steaks over a hot juniper fire, on a grate of green juniper boughs. The charred steaks taste like smoky juniper berries, exotic beyond belief. The meal boosts our strength for the climb to the top, where we will spend the night. A trail to the top existed in prehistoric times, according to Acoma legend. It was destroyed when a storm sliced off a large wedge of cliff. Stranded on top, Acoma men and women died of thirst and starvation.

Our path to the top is difficult, absolutely vertical. We must work our way up a narrow, sandstone chimney. The one rock climber in the group terms it "classical." There are small grooves in the rock, big enough for the tip of a finger or toe, put there in the eons before us by the Indians.



The Acoma tribe's Enchanted Mesa

The first and most experienced of us springs up effortlessly and drops a rope over the side. Next, our sleeping bags, four gallons of water, and tomorrow's breakfast (a few tubes of peanut butter, wild cactus honey, yogurt, and sunflower seeds) are pulled and scraped over the sandstone to the top. The bags look like a yellow-and-blue trilobite on the move.

My turn. I am full of improprieties and feel most unclassical. The climb is scary, arms and legs weak. Stark fear —fear of crashing on the rocks below— is the only power strong enough to move me up. No choice but up. I am trembling and exultant. I have arrived.

We witness a magnificent desert sunset—orange-and-purple flambé on billowing clouds. I remember Abbey's "many hard days of watching cloud formations."

We explore the table-top. The mesa is an enormous sculpture garden. It seems impossible that anything less powerful than the ocean could have sculpted these desert seamounts. We swim through Abbey's "sea of desert." Lichens, almost phosphorescent, glow chartreuse, yellow, orange, and white.

We return to a sparkling fire of juniper and piñon to report discoveries: a cholla cactus, half of it dead, the other half in pink bloom; small, subtle, dry dams in the valley below, built to catch the occasional rains; a prickly pear blooming. There are upright dead piñons and junipers, a desert driftwood gray with fossilized arms that break off easily and burn hotly. We search for those pieces of wood that will not be missed. Still, the vegetation is so sparse that each loss is felt.

Night drops gradually. It brings a skyful of stars and half a moon. Clouds rim all about. Huddled at the fire, we watch the far mesas: thunder and lightning circle us in every direction but remain a safe sky away. Stars fall, and the wind rises. Toward midnight we dangle our feet over the cliff and feel the space beneath. Bats aim their sonar at us—and chitter among themselves. Possibly our presence has fouled their navigation. A pack of coyotes yaps off in the distance. (Abbey insists the earth needs additional coyotes more than it needs additional people.) I go to sleep, satisfied with a count of six shooting stars.

We are wakened by the first orange rays creeping over a mesa to the east. Again we spread out to explore. Small birds follow and hop curiously close. Could be the spirits of the ancient Acomas. On two bluffs I find a series of holes in the rock; they appear to be carved, perhaps for Acoma ceremonies. The first hour of sun turns the sandstone cliffs to an infinity of golds and reds. Words pale. Then the sky deepens to an even, intense blue. The desert settles into its simplifying, brilliant daylight.

We decide to go down, when around 9 a.m. we spot our second four-wheel camper. We're ready to descend before the heat (or the campers) ascends to us. Down is merely a slither through the chimney at the end of a rope. Terrifying. I have ten minutes to learn to trust the rope as well as the man on the other end of it. Will he break my fall if I lose my grip on the classical grooves of the chimney? I stop procrastinating, coil the rope three times around my waist, and do the only thing there is to do without losing more face: descend. The others do likewise. Small, satisfying triumph over terror.

As we leave, we pass the campers, modern conquistadors of New Spain. We thank the gods that the National Park Service has never found a way to build a road to the top. The desert is still as Abbey described it, "clean, pure, totally useless, quite unprofitable." Altogether lovely. □

Patti Hagan is a young New Yorker who has recently discovered that she likes mountains.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Films

The Bigger They Come

BY ARTHUR KNIGHT

Something happens to Broadway's biggest musicals when they get translated to the screen that makes you wonder if they were really that good to begin with. Part of the trouble, I know, lies in the inevitable "opening out" process. Since the camera can accommodate enormous vistas, directors are tempted to enlarge things—like showing us half of Yugoslavia in *Fiddler on the Roof* instead of one lonely *shtetl*, or that ridiculous parade down Wall Street that was supposed to highlight *Sweet Charity*. Because the camera *can* do it, many filmmakers seem to feel that they *must* do it, must enlarge, must expand, must show all of those lovely dollars being spent in lavish profusion. One comes away with a series of rather static views, not unlike those supersized picture postcards that tourists send home as mementos of their more exotic stopovers.

There is also, I suspect, something a bit more fundamental than merely the "opening out" that mars the transition of a really fine musical from stage to screen. What made *Man of La Mancha* a memorable theater experience was that so much of it worked in purely theatrical terms—the schematic sets on a thrust stage, the moody lighting, the costumes that seemed to change their character before your very eyes. When Richard Kiley on the stage momentarily turned his back to the audience and put on the putty nose, sloping eyebrows, gray wig, and pointed beard of the Don, the transformation was applauded as a bit of theatrical legerdemain. When Peter O'Toole offers the same transformation on film, however, the effect is minimal. We all know that between the cuts the make-up man made the changes. Kiley's trick was exciting because he was challenging the limitations of the theater; O'Toole's isn't because his change is accomplished by ordinary cinematic techniques.

There is another way of looking at this. In the past few years, reversing the usual process, a number of musicals have been adapted from motion pictures—*Applause* from *All About Eve*, *Promises, Promises* from *The Apartment*, and, in England, *Gone With the Wind* from *Gone With the Wind*. In all of them it is impossible not to notice how clumsy and lumbering are the transitions from scene to scene. Sets are trundled in from the sides, backcloths are lowered in the rear, chorus boys and girls tote off chairs and tables to clear the stage for the next number. What the movies can accomplish with a simple cut becomes a complicated production in the theater version. There are certain techniques that are indigenous to motion pictures, others that are purely theatrical; and when a hybrid is attempted, either in the theater or in films, the effect can range all the way from disquieting to deplorable.

Peter O'Toole as Don Quixote and James Coco as Sancho Panza in Man of La Mancha.

I regret to say that I found *Man of La Mancha*, the film—even though adapted for the screen by its original writer, Dale Wasserman—in the latter category. There is a long, overly specific, overly detailed prologue (part of the "opening out"), which explains why and how Cervantes landed in jail during the Inquisition, a sequence that delays the first musical number by almost a half-hour. And although the jail itself, designed by Luciano Damiani (who also did the admirable costumes), is marvelously dramatic, with its only exit a huge flight of stairs that ascends ominously to the domed ceiling, the transition to the Italian exteriors against which Cervantes's imaginative tales unfold is both arbitrary and abrasive, a leap in styles that thrusts one suddenly from the film's theater origins to an attempted cinematization.

The episodes in the film that have been developed out of *Don Quixote* reek of *Classic Comics*. There is the inevitable joust with the windmill, the courtyard fight with the muleteers whom the Don mistakes for armed knights, the encounter with the sorcerer of the mirrored shields, who almost overcomes the Don. However, it is at these moments, almost tangential to the theme of the film, that director Arthur Hiller succeeds in making his picture come alive—these and the sequence in which Dulcinea is instructed by the altruistic Don to enter the stables and bind up the wounds of his erstwhile adversaries and is (discreetly) mass-raped for her efforts. But this is the sort of thing that the medium is accustomed to handling, and all one can say is that Hiller has handled it well, with a strong assist from Giuseppe Rotunno's camera work.

The performances that Hiller has obtained from his international cast are beyond reproach. Peter O'Toole plays Cervantes with extraordinary delicacy and restraint and makes the Don delightfully daft and yet affectingly moral and courageous. It is, after far too long a period of self-indulgence, his finest work since *Lawrence of Arabia*—and if he has done his own singing, too, a whole new career lies just ahead. The only reason the question arises at all is that the publicity mills have made so much of the fact that the beauteous, bountiful Sophia Loren actually does sing her own songs in the picture. Her voice is good, if not altogether true, and in her fiery, earthy way she makes the perfect foil to O'Toole's otherworldly Don. And although James Coco fails to explore the comic depths of the Sancho Panza character, at least he avoids the odious ethnic implications of his New York stage counterpart. Harry Andrews, a bit more fussy than usual, ably dominates his roles as both the innkeeper and the governor.

But for all its individual excellences of performance and execution, I found this *Man of La Mancha* disappointing and dull, with dreary stretches of exposition set between the vibrant songs. Putting it on the screen was no doubt a problem nobody could lick. Once you have paid several hundred thousand dollars for a property, how can you possibly tell the author you can't use it because it isn't cinematic? Especially if you have also hired the original author to prepare the movie version? □

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Dance

American Dance—the Heritage

BY WALTER TERRY

Roots of the American Dance is the name Alvin Ailey has given to the new choreographic wing of the striking repertory that he has built for his own Alvin Ailey City Center Dance Company. His internationally acclaimed troupe is racially integrated—it includes blacks, whites, Orientals, and still others who represent a proud combination of several heritages—and Ailey has always sought to establish a repertory as diversified as his dancers.

Along with dances choreographed by John Butler, Donald McKayle, Talley Beatty, Lucas Hoving, and Joyce Trisler, Ailey's own fine creations, such as the magnificent *Revelations*, are on view. Ailey is black and was brought up in Texas, but his dance background is rooted in the techniques and remarkable creativity of a Californian, the late Lester Horton. Thus, he is concerned not only with racial and regional roots but with the roots of dance itself, particularly of American dance.

Ailey's first "Roots" production in his new wing, given a tryout on a late fall tour and presented during his troupe's recent season at the New York City Center, was *The Kinetic Molpai*. It was choreographed almost forty years ago by the late Ted Shawn (often called the Father of American Dance) for his all-male troupe. Gilbert Murray, the great classical Greek scholar and translator, defined a Molpe rite as a celebration (for sowing and reaping, for rain and sun, for fertility, for the answering of prayers) in "dance and song." Mr. Shawn, since he used neither poetry nor song, added the word "kinetic" and pluralized his danced celebration into "Molpai."

Ailey engaged Barton Mumaw, who was featured in some 500 performances of *Molpai*, to coach the Ailey dancers in the Shawn style and to restage it. Jess Meeker, composer of *Molpai*, was at the piano for the New York performances, along with Mary Campbell, who had been Mr. Shawn's accompanist in the late 1920s and '30s. The nine Ailey men, virile as well as virtuosic, were splendid in a pioneering modern dance style basically alien to them—they still have something to learn about preserving individuality within the uniformity of disciplined action—and *The Kinetic Molpai* took its place as an American dance classic. "This is where we American dancers came from," said Ailey after the premiere.

To honor the black heritage, Ailey asked Katherine Dunham to add her thirty-year-old *Choros* to his repertory, and, again, his dancers caught a fascinating dance style from the past. *Choros* is a brilliant exploration of rhythmic movements that mirrors the intermingling of African and European dance roots in Brazilian culture.

Ailey is not settling for just two flourishings of our dance roots, as important as they are. In the spring he will present Carmen De Lavallade in two historic solos by the late Ruth St. Denis: *The Incense*, the opening dance in the program in 1906 that changed the course of dance and of the theater itself, and *The Yogi*, which earned the adulation of European philosophers as well as critics more than sixty years ago. Miss De Lavallade will reconstruct these solos from studying many film clips of Miss St. Denis, who last danced *The Incense* when she was ninety years old. Miss St. Denis's brother, B. St. Denis, who invented spectacular lighting effects for his sister at the turn of the century, has given his warm approval.

The classical ballet, which has its roots in the banquet-fêtes of 500 years ago, never forgets its rich heritage. Ballet companies not only foster new works—essential to the future of the medium—but they also restore, revive, and renew ballets that are centuries old: *Le Fille Mal Gardée*, *The Whims of Cupid and of the Ballet Master*, *La Sylphide*, *Giselle*, and the later *Swan Lake* and *The Sleeping Beauty*. What Alvin Ailey is doing reminds us that restless and inspired dance explorers like St. Denis, Shawn, Isadora Duncan, and Loie Fuller provided American modern dance with new roots in a new dance world, as did the later Katherine Dunham and all those divinely inspired dance creators from all races and regions and heritages who said, "These are our roots. This is where we came from." □

SR CLASSIFIED

CLASSIFIED ADVERTISEMENTS must be consonant with the character of Saturday Review. The publisher reserves the right to accept or reject advertisements at his discretion. Rates for a single insertion, $1.85 per word, 10-word minimum. Box Numbers and Phone Numbers count as two words each. Rates for multiple insertions: 48 times in a contract year $1.45 per word each insertion; 24 times $1.55 per word each insertion; 12 times $1.65 per word each insertion; 6 times $1.75 per word each insertion. Full payment must be received nineteen days before publication. We forward all mail received in answer to box numbers. Mail to be called for at this office will be held 30 days only. Address Classified Department, Saturday Review, 380 Madison Avenue, New York, New York 10017. Tel. 212-883-8040.

LITERARY SERVICES

MANUSCRIPT TYPING. Cassettes, tapes. Ambassador Office Service, 10 East 49th Street, NYC, 10017. PLaza 5-1127.

WORDS! WORDS! WORDS! Speeches, articles, novels. Robert Hogrogian, 201-489-0637.

REPORTS, MANUSCRIPTS, writing, editing, typing. All subjects. Reasonable. Personalized. Confidential. Professional team! RC Research, Box 138, Dayton, Washington 99328.

BOOKS

25% DISCOUNT on new books. Add 39¢ handling. BOOKQUICK, B-3, Roseland, N.J. 07068.

PUBLISHERS' OVERSTOCKS catalogue, free. Write Bookseller, Box 54R, Sherman, Connecticut 06784.

GIANT FREE CATALOGUE. Nearly 4,000 unusual bargains. War surplus! Lenses, projectors, shutters, filters, viewers, lamps, magnifiers, accessories, booklets, kits. Many hard-to-get items. Request Catalogue CR, Edmund Scientific Company, 300 Edscorp Building, Barrington, New Jersey 08007.

FIRST EDITIONS, rare books: Catalogues for year $1.00. Libraries purchased. Minkoff, Rowe Road, RFD 3, Great Barrington, Massachusetts 01230. 413-528-4575—appointment, please.

GOOD USED BOOKS—Wide variety, intelligent selection. Libraries buy regularly; you can too! History, fiction, social sciences, literature, miscellaneous subjects. Send dollar for listing of 20,000 titles and prices. Editions, Desk SR, Boiceville, N.Y. 12412.

SAVE TO 84% on publishers' overstocks. Free catalogue. Readers' Service, 1060 Twin Silo Lane, Huntingdon Valley, Pennsylvania 19006.

OUT-OF-PRINT BOOKS SUPPLIED. Kendall Gaisser, Booksellers, 1242 Broadway, Toledo, Ohio 43609.

SCIENTIFIC PAPERBACKS. Chess Paperbacks. Indicate interests. Box 83-E, Irvington, N.Y. 10533.

NAUTICAL NONFICTION. Naval, merchant, yacht. Sail, steam. Catalogue 25¢. Jack A. Clinton, High Street, Hope Valley, R.I. 02832.

HAVE YOU PASSED MONEY through a stockbroker's funnel? Read Wall Street: Security Risk, a Penguin Book, $1.50.

HATHAWAYS OF AMERICA, complete genealogy, $20. Send check to Hathaway Family Association, William S. Hathaway, 1813 Robeson Street, Fall River, Massachusetts 02720.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

FOREIGN BOOKS

THE FRENCH BOOKSHOP, 700 Madison Avenue (62nd Street), NYC, 10021, where French books are sold exclusively. List sent on request.

GERMAN BOOKS AND CALENDARS mailed anywhere. Catalogue free. Gerard J. Fuchs, 2061 Broadway, NYC, 10023.

BOOKPLATES

FREE CATALOGUE. Scores of beautiful designs. Personalizing and Special designing. **ANTIOCH BOOKPLATE,** Box 28A, Yellow Springs, Ohio 45387.

OUT-OF-PRINT

YOU NAME IT—WE FIND IT. Satisfaction guaranteed. INTERNATIONAL BOOKFINDERS, Box 1-S, Pacific Palisades, California 90272.

NAME THE BOOK. We'll get it! Free search service. CHICAGO BOOK MART, P.O. Box 613-B, Chicago Heights, Illinois 60411.

LOOKING FOR A BOOK? Large stock, free search. Dabney Co., Box 31061-R, Washington, D.C. 20031.

ART

BEFORE YOU SELL—check with us. We may do better for you. We specialize in Fine Prints. By appointment: 212-593-3560. Aldis Browne Fine Arts Ltd., Consultants to Collectors, Trusts, Estates. 20 East 53rd Street, NYC, 10022.

OUTSTANDING SIGNED LITHOGRAPHS. Catalogue free. Yankee Publishing, Box 860, Chula Vista, California 92012.

COLLECT FINE ORIGINAL ETCHINGS and lithographs by the world's great artists including Rembrandt, Picasso, Rouault, Soyer, Landau and Florsheim. Free illustrated catalogue and Master Print Supplement. (Mail 25¢ for handling.) Associated American Artists, Studio 8, 663 Fifth Avenue, NYC, 10022.

"GETTING STARTED IN STAINED GLASS." 30¢. Whittemore, Box D2065, Hanover, Massachusetts 02339.

RECORD MART/TAPES

FREE 162-PAGE CATALOGUE offers over 1,000 fine recordings of Renaissance, Baroque, Classical, Romantic and Modern music. All late stereo recordings. Highest quality at budget label price. Available only by mail from MUSICAL HERITAGE SOCIETY, Box 932-SR, New York, N.Y. 10023.

MUSICAL INSTRUMENTS

NEUPERT HARPSICHORDS, CLAVICHORDS. Oldest, finest. Free catalogue. MAGNAMUSIC, Sharon, Connecticut 08069.

BECHSTEIN: We have yet to meet our first dissatisfied customer. Piano Imports, John Wanamaker Philadelphia, Pennsylvania 19101.

EASY TO PLAY AND MAKE. Quality instruments and kits. Dulcimers (kits $20 up). Psalteries, Banjos, Thumb Pianos; books, records. HERE, Inc., #S, 410 Cedar Avenue, Minneapolis, Minnesota 55404.

COLOR SLIDES

35mm COLOR SLIDES, 10,671 individually sold, described encyclopedia-catalogue. 10¢. Wolfe Worldwide, Dept. 7-122, Los Angeles, California 90025.

SPORTS EQUIPMENT

LIGHTWEIGHT BACKPACK and mountaineering equipment. Imported, Domestic Canoes and Kayaks for day trips, Voyageuring or whitewater. Free catalogue. Moor & Mountain, Dept. 42, Main Street, Concord, Massachusetts 01742.

SCIENTIFIC INSTRUMENTS

GIANT FREE CATALOGUE. Nearly 4,000 scientific bargains. War surplus! Astronomical and spotting telescopes, binoculars, microscopes, magnifiers, sniperscopes, lenses, prisms, project kits. Request Catalogue CR, Edmund Scientific Company, 300 Edscorp Building, Barrington, New Jersey 08007.

TEACHER INSTITUTES

MONTESSORI TEACHER TRAINING. Beautiful campus. Largest U.S. training program. Nationally recognized Montessori Certificate plus graduate credit. Help answer need for Montessori teachers. Write: MMTTC, S.T., 1010 West Chicago Avenue, Chicago, Illinois 60622.

SCHOOLS

VERSHIRE SCHOOL—Coed secondary school (our 5th year) combining scholarship, adventure, work, creativity. Staff background Foreign Service, business, education, Peace Corps. Blending also Peace Corps approaches (study in Mexico, Europe) and imagination with desirable traditional goals. Near Dartmouth. Magnificent scenery. Fifty horses and indoor riding ring . . . all very secondary to warm, outstanding education. Vershire, Vermont 05079. 802-685-4547.

DARROW SCHOOL — Coeducational boarding school. Rugged outdoor environment. Interscholastic sports. Emphasizing community involvement, individual talents. Balance of responsibility and freedom. College preparatory. New Lebanon, N.Y. 12125.

WILDERNESS SCHOOL—team of seven based at 1,000 acre Vermont coed college preparatory school. Includes mountain climbing in Mexico (spring term). For students interested in both academics and vigorous outdoor life. Fullop, Vershire, Vermont 05079.

FARM COMMUNITY SCHOOL PROGRAM for bright students with messy scholarship past. Under thirty students. Innovative program of Vermont approved coed secondary school. Beautiful area. A.C. 802-685-2239.

COLLEGES

ADULT DEGREE PROGRAM for well-informed, highly motivated adults 26 and over wishing to complete liberal arts undergraduate education. Two-week resident periods on Goddard campus alternate with six-month independent study projects carried on at home under faculty supervision. Program leads to Goddard Bachelor of Arts degree. Write Box S, Adult Degree Program, Goddard College, Plainfield, Vermont 05667.

FOR THE GOURMET

TEA DEVOTEES naturally select Grace Rare Teas. Free brochure. Grace Tea Importer, Dept. D72, 799 Broadway, New York, N.Y. 10003.

WINEMAKING KIT—$4.98. Free catalogue and recipes. Jim Dandy Wine Supplies, Box 30230X, Cincinnati, Ohio 45230.

WILD RICE. Fancy $4.00 pound prepaid. 5 pound minimum. Eugene Floura, Blackduck, Minnesota 56630.

FREE—NEW GOURMET COOKBOOKLET featuring appetizers, entrees and desserts flavored with Scotch Whisky. Send name and address to Johnnie Walker Red Cookbooklet, Oxford Display Corporation, Room 999, (SR), 100 Park Avenue, New York City, N.Y. 10017.

PERSONALS

HAWAIIAN PRINTS on COTTON (no synthetics) . . . Come to Carol Brown's, Putney, Vermont 05346. Choose your own. Irish tweeds . . . Dutch/African prints.

OLD LETTERS WANTED. Authors, scientists, military leaders, musicians, American statesmen, etc. Collections and important single items bought and sold. Especially interested in literary material. Catalogues issued. Walter R. Benjamin Autographs, Inc., 790 Madison Avenue (at 67th), New York, 10021. 212-RE 4-3902. Established 1887.

POSITIONS 1973 SUMMER CAMP. Counselors, technical theatre photographer and movie maker. All over 21, excellent athletes, excellent players of orchestral instruments. Appel Farm Arts & Music Center, Elmer, New Jersey 08318.

SILVER AND GOLD sheet and wire at low prices from a working craftsman. ARE Creations, Box 155-S, Plainfield, Vermont 05667. 802-454-8325.

WANTED: HUMOROUS LIMERICKS and quatrains pertaining to science teaching or science subjects. $5.00 each paid for those accepted. Frey Scientific Co., 465 South Diamond Street, Mansfield, Ohio 44903.

GRIPES? COMPLAINTS? TELAGRIPE kit helps you get action. $1.65. P.O. Box 15552, Kansas City, Missouri 64145.

KENNEDY '76. Bumperstrips, 3/$1.00. Buttons, 3/$1.00. ECHO, 136 Church Hill Road, Bridgeport, Connecticut 06604.

SLEEP-LEARNING Equipment—Alpha devices. Strange catalogue free. Autosuggestion, Box 24-SR, Olympia, Washington.

FREE BOOK. Prophet Elijah Coming Before Christ. Megiddo Mission, Dept. 14, 481 Thurston Road, Rochester, N.Y. 14619.

RECORDERS—FINEST MAKES. Largest music selections. Free catalogue. RECORDER CENTER, Amenia, N.Y.

HANG A POET. I'll handprint and frame your favorite poem. A unique gift. 212-648-6232, Box J-298.

MEDITATION evokes New Age consciousness. First-year bimonthly course free. MEDITATION, P.O. Box 566, Ojai, California 93023.

RESEARCH, writing, translations, expertly done. All topics. Reasonable. Professional author. Alex White, Allenhurst, N.J. 07711.

ALPHAPHONE™ headset—brain-wave trainer. Free literature. Aquarius Electronics, Box 627-C, Mendocino, California 95460.

RECORDERS (FLUTES) KUENG SWISS import $12 up; Purcell from $7. Student Special, Corelli $6.50; Recorder Instruction Kit, Soprano Recorder, Method Book, three 7" LP Instruction Records, boxed, $8.95, add sales tax plus shipping $1.50. Recorder Music Methods. Guitar Music. Free catalogue. 12-2-D, HARGAIL, 28 West 38th Street, NYC, 10018.

RUBBER GARMENTS in fashion shades of LATEX and STARSHEEN (Continental) rubber. Illustrated catalogue $4.00 airmail from Kastley Limited, P.O. Box 24, Blackburn, Lancs., England.

FREE CATALOGUE: Low direct prices. Diamonds, Sapphires, Silks, Cosmetics, Crystal, Hunting, Fishing, Camping Supplies. Herter's Inc., Dept. CS, Waseca, Minnesota 56093.

DO YOU HAVE QUESTIONS about smoking and health? Send for free booklet, "The Cigarette Controversy," Dept. SR, The Tobacco Institute, 1776 K Street, N.W., Washington, D.C. 20006.

(Continued on page 78)

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

(Continued from page 77)

PERSONALS

CIGARS FOR THE CONNOISSEUR! Finest imported La Reina de Manila Philippine cigars including Coronas Largas at $9.50 and Vegueros Especiales at $11 per box of 25 each or the superb Coronas Largas Especiales at $23 per box of 50. Interpacific Trading Company, 681 Market Street, San Francisco, California 94105.

PHILOSOPHY—Designed for thoughtful men and women who seek an understanding of the nature of man and the world in which he lives, this introductory course of 12 evening lectures shows how great philosophic ideas of the past and present may be put to effective practical use in daily life. The course inquires into the meaning of human existence; the levels of consciousness; natural law; thought, feeling, and action; and man's function and possibilities. You may join an introductory series of 12 weekly lectures beginning January 9th, 10th, and 11th, 1973. The same lecture is given on Tuesday, Wednesday, and Thursday (7 to 9 p.m. approximately) so that you may vary your evening of attendance from week to week. Join now by mail or from 6:15 p.m. the evening of the first lecture. Tuition is $20. Practical Philosophy Foundation, Inc., 116 East 85th Street, NYC, 10028.

NAVEL-JUICE ORANGES — All varieties Grapefruit. Shipping to 47 states, Canada and Europe. Free brochure. Airport Fruit Shipper, Miami International Airport, Miami, Florida 33159.

GIANT FREE CATALOGUE. Nearly 4,000 scientific bargains. War surplus! Astronomical and spotting telescopes, binoculars, microscopes, magnifiers, sniperscopes, lenses, prisms, project kits. Request Catalogue CR. Edmund Scientific Company, 300 Edscorp Building, Barrington, New Jersey 08007.

FIGHT CRUELTY! Handsome fluorescent bumper/window strip urges: "Be a Real Sport—Hunt with a Camera." 50¢, 3/$1.00. Denny Larke, Box 339, Roseville, Michigan 48066.

TOP CASH PAID FOR LETTERS and documents of famous people. Immediate decision! Immediate payment. Ask TODAY for free brochure, "How To Sell Your Autographs." Catalogues issued. Charles R. Hamilton, 25 East 77th Street, NYC, 10021. 212-628-1666.

"101 CRYPTOGRAMS" with solutions. Some easy, some difficult. Attractively printed. Plastic binding. Wonderful gift. $3.50 postpaid. Barney Rabin Company, 14 Central, Marblehead, Massachusetts 01945.

WALLACE '76. Bumperstickers, 2/$1.00. Wheat's Specialty Company, Box 17413, Memphis, Tennessee 38117.

LETTERS OF AUTHORS, scientists, statesmen, musicians, military leaders, etc., bought, sold. Collections, single items. Catalogues issued. Kenneth Rendell, 620 Bristol, Sommerville, Massachusetts 02144.

I'LL PHOTOGRAPH ANYTHING. anywhere. Stephen Marks, 1005 Princeton N.E., Albuquerque, N.M. 87106.

SITUATIONS WANTED

RESEARCH LIBRARIAN, formerly with leading national magazine, seeks research, library or indexing position. Expertise in these areas plus knowledge of reference materials and information sources. Training in fields of international affairs/politics. New York-New Jersey, Washington, D.C. areas. Box I-263.

FEMALE PSYCHOLOGIST on university leave desires voluntary status on mammalian ethology research team. Knowledge of East Africa but can go worldwide. Available now through 1973. Box 327, Ellicot Station, Buffalo, N.Y. 14205.

LIBRARY ASSISTANT national weekly magazine, and formerly secretary to president of magazine, seeks interesting position book/magazine publishing. Box I-374.

EMPLOYMENT OPPORTUNITIES

TEACHERS, TOP MAINE CAMPS—Sports, Arts. 95 Woodchester Drive, Chestnut Hill, Massachusetts 02167.

AUSTRALIA WANTS YOU!—New Zealand, too! 50,000 Jobs! Paid Transportation! 1973 Handbook and Forms, $1.00. Austco, Box 3623-K, Long Beach, California 90803.

OVERSEAS OPPORTUNITIES—Now Available! Free Transportation! Complete information . . . plus Directory of 200 companies hiring thousands world-wide . . . all occupations. Send $2.00. International Opportunities, Box 29232-MT, Indianapolis, Indiana 46229.

SCIENCE AND MATH TEACHERS—Plan ahead. IES is a professional placement organization listing a wide variety of excellent opportunities in independent schools for outstanding teachers and chairmen. Placement Service, Independent Educational Services, 80 Nassau Street, Princeton, N.J. 08540 (a nonprofit corporation).

EXPERIMENTAL RESEARCH SCHOOL seeks creative, experienced educator to help public schools implement humanistic programs. M.A.+; $11,000-$17,000. Director, N.C. Advancement School, Winston-Salem, N.C. 27101.

AUSTRALIA BY EXPERIENCED AMERICAN. Practical booklet includes costs, education, employment, taxes (none for teachers!). $2.00. Misura, 855 Fifteenth, Boulder, Colorado 80302.

TEACHING POSITIONS In Foreign Countries. New 100-page guide contains information about organizations seeking teachers. Includes requirements, geographic areas, addresses for application forms. Guaranteed satisfaction. Special price $2.00. Foreign Countries, Box 514-K36, Ames, Iowa 50010.

OVERSEAS JOBS—Now hiring, 103 countries, all occupations, high pay, free transportation, tax benefits, latest computerized reports. $2.00. TRANSWORLD, International Airport, Box 90802-K, Los Angeles, California 90009.

AUSTRALIAN OPPORTUNITIES—Paid Transportation! 50,000 Jobs! Latest reports on employment, business, farming, education . . . plus map, forms. $1.00. International Services, Box 19107-MS, Washington, D.C. 20036.

"JOBS IN ALASKA" now available—THE authoritative handbook. $3.15. JIA, Box 1565, Anchorage, 99510.

HOUSES AVAILABLE

For Sale

MARTHA'S VINEYARD waterfront home. $65,000. Box 1608, Vineyard Haven, Massachusetts 02568.

VERMONT. All-season chalets, village homes. Choice acreage. Free brochure. ROLAND BEERS & ASSOCIATES, Manchester, 05254.

WESTERN MASSACHUSETTS—Charming, restored 8-room home. 4 fireplaces. Modern kitchen with appliances. Wideboard floors. Red barn. 4 acres on river. $40,000. Available immediately. 415-387-4148 or Box I-729.

For Rent—Furnished

MONTEGO BAY—Large new villa, superior furnishings, 3 bedrooms, 3 baths. Large pool, beach privileges, ocean view. Staff 3. Six persons $400 weekly to December 15th; $650 to April 15th. SR Box J-65.

ETERNAL SPRING—Beautiful house for rent, heated pool. Apartado 938, Cuernavaca, Mexico.

HOUSES FOR EXCHANGE

RENT-FREE VACATIONS. Write Holiday Home Exchange, Box 555, Grants, N.M. 87020.

MEMBERS EXCHANGE HOMES for rent-free vacations. Write: Vacation Exchange Clubs, 119 Fifth Avenue, New York, 10003.

APARTMENTS AVAILABLE

For Rent

Furnished/Unfurnished

ITHACA, N.Y. Walk to Cornell campus for lectures, concerts. Fairview Heights . . . a new environment for living designed by Marcel Breuer. Write to Fairview Associates, 100 Fairview Square, Ithaca, N.Y., or call Mr. Sullivan, 607-AR 2-3420.

For Rent—Furnished

COSTA DEL SOL, SPAIN—Lovely 2-bedroom apartment directly on beach. Fresh water pool. Maid service. Tennis, golf nearby. SR Box J-409.

APARTMENT FOR SALE

Furnished

5th AVENUE AND 61st STREET, NYC. At $295,000 (price just reduced) it's a bargain. On the 40th floor of the Pierre Hotel, with sweeping views of the Park and the City.

MAGNIFICENTLY FURNISHED. Exquisite details throughout; marble floors and baths. Custom stereo system and variable custom lighting throughout.

LARGE LIVING ROOM, dining room or library, corner master bedroom, 2 fully equipped kitchens, powder room, bath. A sauna. Maintenance $1,350 monthly. Brokers protected. SEEING IT IS UNFORGETTABLE.

Wm. A White & Sons, Lillian Ross, 51 East 42nd Street, New York, N.Y. 10017. Tel. 212-682-7559 or 4515.

APARTMENT WANTED

To Share

EXCHANGE ART STUDENT. Rhode Island School of Design, Providence, urgently needs place to live through June 15th. Reasonable. Family O.K. Susan Tibbon, 1445 Leavenworth Street, San Francisco, California 94109.

OFFICE SPACE AVAILABLE

CHARMING BROWNSTONE DUPLEX OFFICES, East 64th Street, near Lexington, NYC. Gracious executive suite, fully carpeted, with finished basement floor, kitchen facilities. Offices off lovely garden. Suitable for small business, ad agency, publisher, broker, law firm. $1,600 month. Call 212-486-9660.

PROPERTY FOR SALE

WESTHAMPTON BEACH, LONG ISLAND—Prime location. Exquisite oceanfront property—220' on ocean. Thickly landscaped for complete privacy. High dune with beautiful view. $150,000. Jean Carbone, Real Estate Broker, 516-653-4197.

CALIFORNIA'S GOLD COAST—Del Mar—surf view acreage. 15 acres, zoned multiresidential and commercial. 15 minutes to beautiful San Diego Bay, Beaches, Boating. Horsemen's Paradise. Best climate in United States. Property is 5 minutes to UCSD campus, Gulf General Atomic, new VA Hospital and many new industries, and beautiful La Jolla, Surf, Ocean and Torrey Pines State Park Views—UNIQUE. These parcels are available separately or together. Write or call for information and brochure. McKellar & Wyer, Inc., Realtors, 1202 Camino Del Mar, Del Mar, California 92014, Phone Area 714-755-9318, Mr. Robinson.

NORTHERN VERMONT REAL ESTATE. Brooks H. Barron, Kent Mitchell, Realtors, Hyde Park, Vermont 05655. 802-888-4287/2433.

FLORIDA'S EXCITING new Bayfront residential resort. Waterfront, golf course lots. Condominiums, Yacht and Country Club. BAY POINT, Box 9137, SR, Panama City Beach, Florida 32401. 904-234-3308. AD4762.

VERMONT'S NORTHEAST KINGDOM—Homes, land, investment properties near skiing, lakes, mountains. Free Brochure. Peter D. Watson Agency, Greensboro, Vermont 05841. 802-533-2909/2651 until 10 p.m.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

PROPERTY FOR SALE

ONE OF THE MOST UNUSUAL AND SPECTACULAR homes in San Diego County, located approximately 4 miles southwest of Rancho Santa Fe, is now available because the owner has moved to the East. This new contemporary designed residence contains approximately 3,900 square feet on 4 different levels, consisting of a recreation room which is located on the lower level along with a full bath, a fireplace and a kitchenette, a main floor consisting of a living room with 22 foot ceilings, a dining room with stained glass windows and an adjoining patio and kitchen with every modern convenience, a master bedroom on its own private floor with a spacious bath, dressing room, fireplace, and two balconies from which one can see the ocean to the west and the mountains to the south and east. Finally, on the top floor there are 2 bedrooms and a bath along with 2 studies which could be converted into 2 bedrooms.

THE POOL is surrounded by real and imitation boulders and has every imaginable facility including high and low diving boards, waterfalls, slides, outdoor barbecue, wet bar, and snack bar as well as two unusual cavern-like dressing rooms (the owner has invested over $100,000 in this area alone).

A RECESSED LIGHTED TENNIS COURT with dressing rooms is located a short distance from the house and to the south are stables large enough for boarding three horses but which are readily expandable.

THERE IS ALSO A SMALL HOUSE consisting of 2 bedrooms and a bath, which could be either servants' quarters or a guest house with certain renovations.

THERE ARE 17 ACRES which would be difficult to surpass in beauty and strategic location because of the magnificent view of the ocean and the mountains, along with a rolling green lawn and beautiful gardens with towering eucalyptus trees. This is a truly unforgettable estate in which the owner's investment is $585,000. The asking price is $495,000. Liberal financing is available.

ROBERT K. SMITH, Realtor, 7911 Herschel Avenue, La Jolla, California 92037. 714-459-4471.

BUSINESS OPPORTUNITIES

INTERESTED IN OWNING A FRANCHISE?—Business of your own, or full- or part-time money-making opportunities? Find out what's available. Send name for FREE *5-month subscription to Salesman's Opportunity Magazine*, Dept. 1061, 1460 Hancock Center, Chicago, 62611.

CAMPS

HAS YOUR TEENAGER OUTGROWN "CAMP?" Vagabond Ranch, Granby, Colorado, provides superb western experience. 27th summer. Boys, girls 11-17. Also March Ski Camp at Vail. Charles D. Pavek, Washington, Connecticut 06793.

DRAMA, MUSICAL COMEDY, Dance, Art, TV, Filmmaking—Public Performances, Sports. Nation's foremost summer training center, featured article in N.Y. Times—on Lake Sunapee, N.H. Coeducational. 10-18. 8 weeks, $1,195. Beginners Showcase Art Center, Dept. 14G, 240 East 76th Street, NYC, 10021. 212-249-9288.

RETIREMENT LIVING

RETIREMENT LIVING AT ITS FINEST at Crestview Center in the heart of the residential metropolitan Toledo (Ohio) area. A specially-developed community where retired people share the security of health services, the comfort of never being alone, the assurance of protection against inflation, the independence of coming and going as they please. Life lease or a new monthly fee plan available. For complete information, write Mr. Maurice Seible, Director of Development, Crestview Center, Harroun Road, Sylvania, Ohio 43560.

VACATIONS

TAMARINDE GUESTHOUSE. All comforts, yet reasonable. *Reserve now, P.O. Box 247, St. Maarten, Netherlands Antilles.*

SHENANDOAH VALLEY FARM — Beautiful, secluded, quiet, comfortable. Dixons, McGaheysville, Virginia 22840.

JEWEL BOX ELEGANCE, Lighthouse Inn, 52-room mansion showplace of the shore at New London, Connecticut. 2½ hours from Gotham. Superb food. E.P. Doubles $15 up. Brochure S.

VACATIONS

PATAGONIA RANCH HIDEAWAY. Superb scenery . . . sun . . . air . . . for riding, swimming, tennis, birding. Circle Z Ranch, Patagonia, Arizona 85624. Brochure.

SAN FRANCISCO ON A BUDGET? Charming, centrally located. Hotel Beresford, 635 Sutter Street.

THE SEASIDE, unspoiled Longboat Key, Florida 33577. Year 'round resort on private beach.

CARIBBEAN SEA: Superb offshore reefs, snorkling, other activities. Economical efficiencies. CARIBE PLAYA, Patillas, Puerto Rico.

FLORIDA KEYS—ISLAMORADA, Box 222R, Drop Anchor Resort Motel. AAA. Relaxed oceanfront tropical living. Efficiencies. Pool. Brochure.

BUCKS COUNTY — If you can't be a house guest in Bucks County, be ours. The 1740 House is a charming country inn. 24 rooms, each with terrace, overlooking the Delaware River. For a brochure, write: 1740 House, Lumberville, Pennsylvania 18933. Tel. 215-297-5661.

NASSAU—Relax in 1-2-3 room apartments. On excellent beach, pool. Cable Beach Manor, Box 263, Nassau, Bahamas.

HOTEL ON SMALL ISLAND—Pool, superb beaches, remote, peaceful. $25 double. Write Sportsman's House, Vieques Island, Puerto Rico 00765. 809-741-3751.

A TREASURE by the sea. Unique oceanside resort apartments. Leisure living in tropical tranquillity—or exciting sport fishing and imaginative underwater exploring. Interested? Sunburst South Resort, Box 145, Islamorada, Florida Keys, 33036.

WHALER'S INNE, Mystic, Connecticut—Inviting, homey seatown hostelry, walking distance to famed Mystic Seaport marine museum. Doubles $14-$24; 4 persons, $20-$24. Reserve by mail or phone.

PARADOR MARTORELL, inn by world famous Luquillo Beach. Box 384, Luquillo, P.R.

SUMMER WORKSHOPS

EXCITING EXPERIENCE: On-stage, back-stage, workshop involvement with professional company. 8 weeks. Age 16 up. Fee $700. College credits available. Forestburgh Summer Theatre, RD 1, Monticello, N.Y. 12701.

SUMMER STUDIES ABROAD

LONDON THEATRE AND DANCE. July 1973. Two courses featuring shows, master classes, celebrity lectures. Four hours credit. Write: ETSP, Theatre Department, Southern Methodist University, Dallas, 75222.

A REMINDER—Lesley Frost, Escuela de la Tahona, Segovia, Spain.

JAPAN summer study. History, arts, architecture, religions, and current social trends. Based in Tokyo and Kyoto; excursions to ancient cities of Nikko and Nara. June 19th to July 7th. Lectures in English by Japanese scholars. University of California Extension academic credit. Write: Dept. SR, Japan Program, UC Extension, Berkeley, California 94720.

ROME, ITALY. Fourth consecutive summer. Stimulating faculty, diversified curriculum including Etruscan archaeology. $765. June 18th-July 22nd. Trinity College/Rome Campus, Hartford, Connecticut 06106.

STUDIES ABROAD

HACIENDA EL COBANO. The University of Oklahoma's Study Center, Colima, Mexico, offers credit and non-credit programs for 1972-'73.

SPANISH: High school, adult and college level.

WORKSHOPS: High School Art Workshop. Watercolor Painting, Archaeology, Ornithology, Human Relations, Creative Writing, Mexican Investment and other programs as requested. Dr. Richard Hancock, 555 East Constitution Avenue, Norman, Oklahoma 73069.

STUDIES ABROAD

PRAESTEGAARD FILM-VIDEO-PHOTOGRAPHY — A school/workshop/community with complete working and living facilities. Write: David Nelson, Director, PRAESTEGAARD, Kettrup pr., 9690 Fjerritslev, Denmark.

COLUMBUS INTERNATIONAL COLLEGE of Spain—A 2-year American liberal arts University in Seville. Freshman-sophomore curriculum, American faculty, dormitory boarding, Fall-Spring semesters. Write: Columbus International College, Avda Victoria, 43, Seville, Spain.

PHOTOGRAPHIC ARTS IN DENMARK—Photography and cinema in a Fine Arts program at KYO Castle in north Jutland. The accredited Limfjord College has openings for '73 semesters. Write: Box 408, Amstelveen, Holland International Administration office.

TRAVEL

NICHOLSON'S INTERNATIONAL YACHT CHARTER Services. All sizes and types in the Caribbean, Mediterranean, Greek Islands. Apply airmail to V.E.B. Nicholson & Sons (Antigua) Ltd., 5 Lynch's Quay, Cobh, County Cork, Ireland.

ROUND THE WORLD EXPEDITION—180' yacht. Remote places—Galapagos, Easter Island, Tahiti, Fiji, etc. Share expense. Shipmates wanted. Fried, Apt. 1A, 330 East 49th Street, NYC, 10017.

NEW YORK CITY, HOTEL BEDFORD, 40th Street, Just East of Park Avenue. For the discriminating guest who prefers a quiet and gracious hotel in the midst of New York's most convenient Grand Central area . . . near all shopping and entertainment. Beautifully decorated rooms and suites . . . featuring fully equipped kitchenettes . . . air conditioning and TV . . . ideal for families . . . Continental Restaurant and Cocktail Lounge. Write for brochure, 118 East 40th Street, New York, N.Y. 10016.

BICYCLING-HIKING-CAMPING trips through the countrysides of the world for 14-17 year olds. Europe, New England, Colorado, Canada. Free brochure includes bicycle equipment catalogue. Student Hosteling Program of New England, Inc., Rochester, Vermont 05767. 802-767-3297.

MEXICO BAJA PENINSULA land tour departs Yuma January 20th. See Baja's remote regions in our comfortable safari vehicles. 19 days $665. This is our tenth year. Fly home from La Paz. Write for brochure. Tag-A-Long Tours, Box 1206H, Moab, Utah 84532.

WORLDWIDE FREIGHTER GUIDE — $1.75. Rates, schedules. 700 passenger carrying Freighters. TravLtips, 40-21Z Bell, Bayside, N.Y. 11361.

FOR HIGH SCHOOL STUDENTS and Graduates. Unique summer travel in Europe—Russia—Africa. Please write: George M. Shumlin, Putney Student Travel, Putney, Vermont 05346.

SAILING VACATION ABOARD popular sailing ship MAVERICK in the Virgin Islands. $215 all inclusive. Free folder. WESTINDIAMAN CRUISES, 95 Idlebrook Lane, Box S, Matawan, N.J. 07747. Phone 201-566-6416.

THIS AD + $7.00 per person, double occupancy entitles you to real value New York. Next time try CENTURY-PARAMOUNT HOTEL, 235 West 46th Street, convenient theatres and everything; 650 rooms, with bath, TV, air conditioning. Single-$10.00. Don't delay, reserve now. This is a "sleeper" in every sense.

FOR STUDENT TRAVEL or Study or Camping or Summer Ski Camp . . . small groups . . . leisurely pace . . . lively, flexible programs . . . leaders of caliber, taste and wit . . . Itineraries in Western Europe, Israel, Scandinavia, Russia, Greece, Yugoslavia, Africa. 16th year. Students Abroad, Mark and Harriet Parets, Directors, 771-S West End Avenue, NYC, N.Y. 10025. 212-928-7878.

YACHT CHARTERS BY NICHOLSON. 22 years of providing superb yachts and crews, plus an uncanny ability to anticipate your personal requirements. Contact V.E.B. Nicholson & Sons for Caribbean charters. Box 103, St. Johns, Antigua, W.I. Tel. St. John's 20439.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

Reg. U.S. Patent Office

Kingsley Double-Crostic

By Janet Elliott Cameron

No. 2020

DEFINITIONS

A. Where one would find the seaport, Vancouver (2 wds.)

B. _____ spotted fever, caused by Rickettsia transmitted by ticks (2 wds.)

C. Disliked

D. Large basket

E. Swampy, partly forested region in Florida

F. Film director: Gentlemen *Prefer Blondes* (2 wds.)

G. Tore away

H. John _____, English clergyman, Archbishop of Canterbury 1691-94

I. Pessimist (slang)

J. A bribe (2 wds.)

K. Composer of the opera *Manru* (2 wds.)

L. Gibe

WORDS

39 118 45 27 151 141 22 157 52 59 208
184 147 234 164
192 60 28 154 40 167 117 53 38 177 183
230 136
148 173 160 126 224 198 214 29 144
171 185 30 127 155 191 210 218
228 18 23 31 54 220 203 130 47 113
55 172 14 206 48 34 120 236 125 193 24
202 138 158 188 196 41 19 35
49 25 15 114 36 216 153 140 189
174 225 161 142 205 233 115 207 56 219 169
122 112 16 50 190 221 199 43 215
32 223 209 123 227 57 197 159 137 121 44
168 37 119 128 239
124 222 170 213 139

DEFINITIONS

M. Excessively detailed

N. Site of the last stand made by William Lyon Mackenzie (2 wds.)

O. Bridge (comp.)

P. A personal or selfish motive (colloq.; 4 wds.)

Q. Its capital is Hanoi (2 wds.)

R. Most popular name for water craft

S. Old-time actress: *Tugboat Annie*

T. Freedom from error

U. Neat (comp.)

V. Dame _____, English actress (2 wds.)

W. Welsh parson in *Merry Wives of Windsor* (3 wds.)

X. Publius Terentius Afer, Roman playwright (var. sp.)

WORDS

17 46 33 51 129 26 241 116 58 162 217
21 143
104 92 1 99 211 10 65 135 110 81
93 12 5 105 163 68 75 226 133
13 69 2 180 201 74 61 106 82 231 134
3 72 165 186 89 240 62 76 195 83 66
102
90 84 100 103 149 77 111 70 235
146 98 67 152 194 78 85 175
79 4 63 97 237 107 181 101
73 8 182 242 212 94 11 204
176 229 80 96 131 145 7 64 71 86
156 187 20 150 6 232 42 166 108 132 91
87
88 109 9 238 178 95 200 179

DIRECTIONS

Don't let the definitions scare you. If you can guess five or six of these WORDS correctly, you should be able to solve the Double-Crostic . . . . When you've guessed a WORD, fill in the dashes, and also write each letter in its correspondingly numbered square in the diagram. When all the squares are filled in, you will have a quotation from a published work. Dark squares indicate the ends of words. If there is no dark square at the right side of the diagram, the word carries over to the next line . . . . You should be able to see words and phrases begin to form in the diagram on the basis of having just a few letters. Enter the letters you can guess into the diagram and the blanks in the defined WORDS, and you'll find yourself working from WORDS to diagram and back, solving the puzzle . . . . The initial letters of the defined WORDS spell the name of the author and the title of the work from which the quotation was taken. This acrostic feature can be very helpful to the solver.

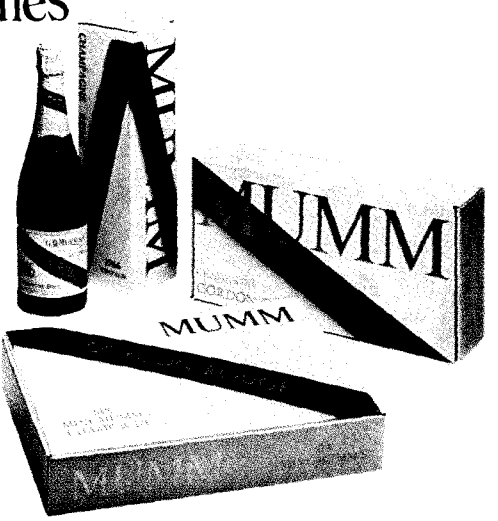
1 N	2 P	3 Q	4 T	5 O	6 W	7 V	8 U	9 X		10 N	11 U	12 O	13 P	14 F	15 H	16 J					
17 M	18 E	19 G	20 W		21 M	22 A	23 E		24 F	25 H	26 M	27 A		28 B	29 C	30 D	31 E				
32 K	33 M	34 F		35 G	36 H	37 K	38 B		39 A	40 B		41 G	42 W	43 J		44 K	45 A				
46 M	47 E	48 F		49 H	50 J	51 M	52 A	53 B	54 E	55 F		56 I	57 K	58 M	59 A	60 B	61 P				
62 Q	63 T	64 V	65 N		66 Q	67 S	68 O	69 P	70 R		71 V	72 Q	73 U		74 P	75 O	76 Q				
77 R	78 S	79 T	80 V	81 N		82 P	83 Q		84 R	85 S	86 V	87 W		88 X	89 Q	90 R	91 W				
	92 N		93 O	94 U	95 X	96 V	97 T	98 S	99 N		100 R	101 T		102 Q	103 R	104 N	105 O				
	106 P	107 T	108 W	109 X	110 N	111 R	112 J	113 E		114 H	115 I	116 M	117 B	118 A	119 K		120 F				
121 K		122 J	123 K	124 L		125 F	126 C	127 D	128 K	129 M	130 E		131 V	132 W	133 O	134 P					
135 N	136 B	137 K		138 G	139 L	140 H	141 A	142 I	143 M	144 C	145 V	146 S		147 A	148 C	149 R					
150 W	151 A	152 S		153 H	154 B	155 D	156 W	157 A	158 G	159 K	160 C	161 I	162 M	163 O		164 A	165 Q				
166 W		167 B	168 K	169 I	170 L		171 D	172 F	173 C	174 I	175 S	176 V	177 B	178 X		179 X	180 P				
181 T	182 U	183 B	184 A	185 D	186 Q	187 W	188 G	189 H		190 J	191 D	192 B	193 F	194 S		195 Q	196 G				
	197 K	198 C	199 J	200 X	201 P	202 G	203 E	204 U	205 I		206 F	207 I		208 A	209 K	210 D	211 N				
212 U	213 L	214 C	215 J		216 H	217 M	218 D	219 I		220 E	221 J	222 L	223 K		224 C	225 I	226 O				
227 K	228 E	229 V	230 B	231 P	232 W		233 I	234 A	235 R		236 F	237 T	238 X	239 K	240 Q	241 M	242 U				

Solution of this week's Double-Crostic will be found on page 69 of this issue.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED

It was marzipan, carols, candles and Mumm was the word.



The era is gone.
Except for us.
This Christmas you can still give the finest champagne the world has ever known.

Mumm's the word. Always will be.

IMPORTED BY BROWNE VINTNERS COMPANY, NEW YORK, N.Y., AND SAN FRANCISCO, CA.

PRODUCED 2005 BY UNZ.ORG
ELECTRONIC REPRODUCTION PROHIBITED